The Chemical Age

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Chemical Industry and the Exchanges

THE most striking testimony to the stability of Great Britain is the fact that the pound sterling, suddenly loosed from all its moorings, has steadied itself so quickly and for some days now has been slowly rising, and the further fact that conditions which would have caused a national panic anywhere else have produced scarcely any effect on our national habits or temper. This is the spirit that impresses all other nations and is the best guarantee that we shall come safely through.

In the meantime the disorganisation of the foreign exchanges is producing, as it was bound to do, a certain amount of confusion. The chemical importer is faced by two difficulties. The first is the difficulty of doing business on exchange rates that are constantly fluctuating, the second is the demand by some foreign firms to be paid in their own currency, though they have hitherto accepted sterling as a matter of course. If in addition home importers have entered into forward contracts to supply home customers, they may be threatened with loss owing to having to purchase at higher prices.

In the case of chemical manufacturers and exporters the position is just the reverse, and already, we are assured, the difference in the exchange rates is having a stimulating effect on foreign inquiries and has already resulted in business. Further, it is a reasonable inference that home customers, faced with import difficulties, will be induced to purchase supplies from home sources. Already, according to information that has reached us, Germany is getting anxious about the possibility of successful competition from British chemical manufacturers.

Generally, the present situation may be summed up thus. For manufacturers of British chemicals and plant, the drop in the foreign value of sterling is for the moment a distinct advantage, since it automatically lowers prices to foreign buyers. On the other hand, the importing class find their operations hampered at several points.

Chemistry and Gas Progress

SIR DAVID MILNE-WATSON, who presides with such ease and charm as well as ability over the greatest gas undertaking in the world, must have felt rewarded for his great work by the convincing compliments that were paid to it in London on Saturday. The occasion was a luncheon given by the Gas Light and Coke Co. to some 200 members of the British Association, following their inspection of the Fulham laboratories and works. The speakers were Sir J. Alfred Ewing, Sir Richard Threlfall and Sir Harold Hartley, and their testimony was emphatic on several points. The first and the most important was that, in spite of the developments of electricity, gas remains for heating, lighting and power purposes an even more important agent than it has ever been. To Sir David Milne-Watson much of the credit for this must be attributed, for his public-spirited leadership of the industry, for his confidence in its future and for the wise and generous way in which he has brought chemistry and engineering into its service. Professor Henry E. Armstrong, whose words of caustic wisdom have not all fallen on stony ground, was quoted as saying once that the engineer could do nothing until the chemist showed him the way. One need not stop to discuss the relative or rival contributions of chemistry and engineering to the maintenance and progress of the gas industry, but one may safely say that what Sir J. A. Ewing called the " very happy combination of engineering and chemistry " has been a very powerful factor in the growth of the Gas Light and Coke Co. to its present supreme position in the industry. The company were appropriately reminded, during the centenary celebrations, of Faraday's belief in the future of gas, and of the chemist's indebtedness to it in his laboratory work; and Sir Alfred Ewing, with equal appropriateness to the conditions of the time, predicted that those patriotic people who invested to-day in British securities would find themselves in

the happy position of those who, in the early days, put their faith in gas. Sir David Milne-Watson, in his reply, had much to say of the history of his great company and of its liberal employment of research, and he could hardly have chosen a more convincing illustration of the way in which gas keeps pace with public needs than the remarkable street lighting and floodlighting recently witnessed in London.

These speeches were, however, but interesting comments on an educational experience that the British Association delegates had undergone earlier in the morning. Admirably organised in small parties, under the charge of guides who clearly and courteously explained the processes to them, they had been shown all the essential features of modern gasworks practice on an immense scale, and been made to realise what a highly complex scientific system it is by which we get our gas and so many valuable by-products from coal. But perhaps the most interesting experience of all was the inspection of the Fulham laboratories which were modernised and greatly extended in 1928 and where the fundamental as distinct from the local research work is concentrated. Among the first things to catch the eye were the high pressure hydrogenation plant for the treatment of coal tar and some of its products, the manufacture of hydrogen from water gas, the experimental work on heat transfer, the removal of benzol from coal gas, methods of continuous gas sampling and numerous testing and recording apparatus. In the by-product section were some beautifully clean samples of sulphate crystals of various sizes—the control of size and shape being now a solved problem—side by side with a sample of German synthetic sulphate which seemed hard as a rock. It was interesting to compare a model of Faraday's first design of a baffle, consisting of three successive vents, to check down draught, with the company's very latest design for use with geysers. In one corner was the latest type of floodlighting lamp, illustrating the immense penetrative power now attained. In addition to some interesting samples of refractories, methods were shown of methane production, measurement of catalyst activity, production and testing of cokes, and numerous other processes. The visit, which was highly educational and interesting, was admirably organised throughout, and the visitors left with pleasant recollections of the courtesy and intelligence of the staff in charge.

The Digestion of Grass

In the old days the digester was packed full; a hundredweight more or less did not matter. We threw in a lump of caustic, turned on the steam and chanced the rest. Life in the mill seemed just a car load of troubles and irregular results were considered normal. Then the chemist arrived with balance and thermometer, pressure gauge and glass apparatus, and though a few wordy battles had to be fought before his supremacy was established, to-day the paper making industry is rapidly becoming a scientific one.

Write bamboo for grass, solve the problem of turning this into pulp, and you have an almost inexhaustible raw material which, moreover, is an annual crop. Mr. W. Raith has wrestled with this problem in Burma, latterly with the assistance of the Government of India, for the past 25 years, and he claims to-day to be able to produce first class bleached pulp, with a yield of 42 per cent., both easily and economically. It is well known that the timber resources of the world are rapidly disappearing we already talk of the possibility of using bakelite or steel to substitute timber. It takes at least 25 years to bring a spruce tree to pulp wood size, though in the Southern States of America it is possible to grow loblolly pine in 10 years from which, as Dr. A. D. Little has demonstrated, excellent newsprint can now be made quite contrary to the statement of old time papermakers. The chemist has arrived; his efforts for the papermaker promise to provide both new sources of cheap pulp wood in vast amount at a time when the previous supplies were becoming scarce and dear, and, far more important, pulp from an inexhaustible supply of an annual grass. We can both scribble and buy newspapers, secure for the future.

Books Received

Recent Advances in Organic Chemistry. Vols. I and II. By Alfred W. Stewart. London: Longmans, Green and Co., Ltd. Pp. 430. 21s. Pp. 432. 21s.

Quantitative Chemical Analysis. By Frank Clowes and J. Bernard Coleman. London: J. and A. Churchill. Pp. 604. 18s.

Linoleum Handbuck. Dy Dr. H. G. Bodenbender. Berlin-Steglitz: Chemisch-technischer Verlag Dr. Bodenbender, Feuerbachstr 6. Pp. 506. 13s. 6d.

Chemistry in the Service of Man. By Alexander Findlay. London: Longmans, Green and Co., Ltd. Pp. 356. 6s.

Advancing Science. By Sir Oliver Lodge. London: Ernest Benn, Ltd. Pp. 191. 6s.

Physical Chemistry for Colleges. By E. B. Millard. London: McGraw-Hill Publishing Co., Ltd. Pp. 522. 18s. 9d.

The Principles of Organic Chemistry. By James F. Norris. London: McGraw-Hill Publishing Co., Ltd. Pp. 595. 15s.

Phantastica, Narcotic and Stimulating Drugs. By Louis Lewin. London: Kegan Paul, Trench, Trubner and Co., Ltd. Pp. 335. 15s.

University of Manchester. Prospectus of University Courses in the Municipal College of Technology, Manchester. Session 1931–32. Pp. 300.

Colloids. By Ernest S. Hedges. London: Edward Arnold and Co. Pp. 272. 12s. 6d.

A Merchant-Adventurer in South America. By John Benn. London: Ernest Benn, Ltd. Pp. 139. 6s.

Armadas of the Sky. By Paul Murphy. London: The Houghton Publishing Co. Pp. 120. 5s.

Economic Conditions in Newfoundland to June, 1931. Report by H. F. Gurney. Department of Overseas Trade. London: H.M. Stationery Office. Pp. 68. 2s.

The Chemistry of Laundry Materials. By D. N. Jackman. London: Longmans, Green and Co., Ltd. Pp. 234. 6s.

The Calendar

October 5	Sir John Cass Technical Institute: Inaugural Ceremony Session 1931-32. 8.15 p.m.	Jewry Street, Aldgate, London.
5	Society of Chemical Industry (London Section): "Recent Applications of Science to Agriculture." Sir Daniel Hall. 8 p.m.	Burlington House, London.
6	University College Chemical and Physical Society. Inaugural Address: "On Regularities of Molecular Distribution in Liquids." Professor P. Debye. 5 p.m.	University College, London.
7	Institute of Fuel: "Coal, Smokeless Fuel and Oil from the National Standpoint." Dr. W. R. Ormandy. 7 p.m.	Institution of Electrical Engineers, London.
7	British Road Tar Association Luncheon. 12.45 p.m.	Hotel Metropole.
9	Chemical Engineering Group: "The Manufacture and Testing of Asphalt Paving Material." D. M. Wilson. 8 p.m.	Burlington House, London.

The British Fuel Problem

The Future Possibilities of Coal and Oil

A symposium on the British Fuel Problem was held by the Chemistry Section of the British Association on Monday last, September 28, when addresses were delivered by Sir David Milne-Watson (Governor of the Gas Light and Coke Co. and President of the Institute of Fuel), Sir John Cadman (Chairman of the Anglo-Persian Oil Co.) and Mr. H. T. Tizard (Rector of the Imperial College of Science and Technology).

In his address on "Coal," Sir David Milne-Watson gave statistics as to the loss of a large proportion of our coal export trade and of the falling off of home consumption, which was attributed to (1) The development of new mining areas (*e.g.*, Holland and Spain); (2) the post-War reconditioning of the mines of Northern France and Belgium; (3) the progress of water power in Scandinavia, Switzerland, Italy, and France; (4) the increased use of oil as fuel; (5) advance of efficiency of power production from given weights of coal; and (6) the demand for fuels which give a much higher standard of performance so that the coal producer is compelled to spend money on pre-treatment before sale and at the same time has to sell one-third of the entire yield of coal at 5s. to 8s. per ton less than the cost of raising.

The Need for Wise Development

In consequence of these influences there is a world-wide slowing down in the use of coal, especially in its raw state. During the decade 1918–1928 the world consumption of coal remained at a steady figure of 1,200 million tons annually, but whereas at the beginning of the period this quantity represented 85 per cent. of the world's requirements of energy, at the end it had fallen to 75 per cent. Whilst the economic activity of the world is at least 25 per cent. greater than 16 years ago the consumption of coal in that period has increased by an amount barely equal to what would have been expected previously in a single year. Our export and bunker trade, once so important, has fallen to some 75 million tons per annum, in spite of the undoubted superiority of our coal and of the vigorous efforts made to maintain our predominant position. The effects of economy in use and of the depression in the iron and steel trades have also diminished the demand for coal at home, and prices have fallen to unprofitable levels.

The cheapness of natural oils has seriously affected the Scottish shale industry which is to-day in a precarious condition. Normally this industry produces 42·5 million gallons of oil annually. In 1929 our imports from abroad of fuel oils, lubricating oils and motor spirit amounted to over 2,000 million gallons. Our Navy is almost entirely dependent upon oil fuel, as also are the Air Forces, the Army and public transport. The only other home source of oil besides shale lies in the 380 million gallons of tars and benzole from the carbonizing industries. The country is, therefore, faced with a serious fuel problem. It is certain that progress cannot be impeded. Energy, whether for heat, light or power, must be obtainable at the lowest possible cost if our manufacturers are to compete in the world markets, and if we are to maintain the present and essential standards of domestic and public life. We have no water power of consequence and no natural oils. Ours is a coal country and it is therefore all important that our national resources should be wisely developed.

Work of the Fuel Research Board

The tangible results of these inquiries have been the setting up of the Fuel Research Board, the encouragement given to fuel technology, the National Electricity scheme, considerable interest in low temperature carbonisation, and the formation in the Sheffield area of a gas grid scheme. From the Fuel Research Board there has emanated much valuable work in connection with the various carbonising processes and with hydrogenation. Perhaps the most important work of all has been the setting up of the Scheme for a National Coal Survey. The outside observer may claim that some of the investigations into technical matters carried out by the Board have been a duplication of the work done by investigators and research organisations of various fuel producing and using industries. It cannot be proclaimed, however, too often what a valuable and steadying influence has been exerted by the opinions of an impartial body like the Fuel Research Board.

The industrial use of coal shows a steady fall. This is due in part to trade depression, and for the remainder to improvements in methods of use. The conversion of coal to power involves two steps—first, the production of steam and secondly the conversion of this steam into power. The first stage is being carried out year by year with improved efficiency and many industrial works to-day are able to approach the 85 per cent. or so of the super-power station. The same cannot always be said of the plants using steam, of which many are still very extravagant. Nevertheless, there are many instances of high efficiency in the use of steam being secured by the employment of pass-out turbines coupled with the application of the exhausted steam to process work. The total of private power plant in the country is estimated at 12 million horse power. In some of these installations the use of coal in the pulverised form has been adopted. By this means coal is given the properties of a liquid for handling and of a gas for purposes of combustion. The efficiency of combustion is raised, and whilst the ash content becomes of less moment, it must be admitted that at present there is a serious difficulty in the emission from the chimneys of an impalpable ash dust which is destructive to vegetation.

Most of the coal used for the manufacture of iron and steel is prepared by conversion into coke at coke ovens, and producer gas at steel works. The depression in the iron and steel trades has here affected the demand for coal which has fallen from 31·4 million tons before the war to 18·79 million tons last year. Some portion of this fall arises from improved efficiency and when the industry is restored to prosperity a further saving under this heading may be expected. In this country coke ovens are mainly associated with collieries. Iron works are to be found near the deposits of ore and occasionally associated with steel works, but as a rule steel works are situated away from collieries, ovens and blast furnaces. This lack of juxtaposition and co-operative working has made the British figure for coal used per ton of steel reach 2–3 tons, whereas in Germany and America, owing to the common centralisation of all works on one site, effecting a ready interchange of energy in the form of coke, blast furnace gas, coal gas, and electricity, a figure of 1¼ tons of coal is attained. In recent years the linking up of gas works with coke ovens and steel works has been practised in America and Germany, and quite recently Parliament has approved the setting up of such a joint scheme between the coke ovens, steel works and gas works in the neighbourhood of Sheffield.

Carbonisation of Coal

Carbonisation of coal is almost entirely confined to two industries—the gas industry, which exists for the supply of gas and coke to the domestic and industrial consumer, and the coking industry, whose primary object is the supply of coke for the manufacture of iron. Each industry treats some 18 million tons of coal per annum, or 36 million tons in all. Their methods are in principle identical; both carbonise the coal at a temperature of 1,100° C. as distinguished from the 600° C. used in low temperature processes. Their products are of the same nature, comprising gas, coke, tar, benzole and sulphate of ammonia. The relative proportions of gas and coke made for sale by the two industries differ as in each case the product which is not the primary one is used for heating the retorting vessels.

Interest in low temperature carbonisation centres round two products—coke and oil. Until recent years it could be argued that low temperature coke possessed properties more akin to raw coal for domestic use than did gas coke. It has been found, however, as the result of research, that by the blending of coking and semi-coking coals, by alteration in the degree of crushing before carbonising, and by improved methods of quenching, gas coke can be produced which is an ideal fuel not only for hot water supply, but for open grates, and the increases in sales of coke graded for these purposes have been phenomenal during the past few years.

Sir John Cadman, speaking of oil, said oil cost per ton to raise only one-quarter what coal cost. True, it had to be

brought great distances to the main centres of consumption, but you could only put a barrier to the normal flow of the liquid in defence of the solid fuel by taxation at a level which would be very detrimental to the industrial development of the country. Great Britain's fuel problem, however, had to be surveyed as part of the world problem. Oil's advance in use was phenomenal, and no fears need be entertained that the great mechanical and industrial structure built on oil was in any danger from shrinkage of supplies or failure to increase them. For industrial purposes the future held out prospects of gradual diminution of whatever competition now existed between coal and oil. The geographical situation (of oil and coal resources and of the localities where fuel, light and power were required) might well be a determining factor, and though oil would for a long time to come be largely produced in desert regions, the effort to make Britain self-supporting in the production of oil would, he thought, have been to cut our own throats.

Future Possibilties

Discussing "future possibilities," Mr. H. T. Tizard said the need was to persuade the public and our rulers to take the broadest possible view of the fuel problem, and not to be led astray by the many antagonistic aims now being pursued in the progress of the industry. The resuscitation of the coal industry depended on increasing the demand for coal; yet, on the whole, there was every possible incentive for increasing the efficiency of the use of coal, and he quite definitely thought all the signs showed that, even if industry became prosperous again, we should not, except for a year or two, get any increase in the home consumption of coal. The general trend would be downward, a fact of great significance socially to a country one-tenth of whose inhabitants were dependent on the prosperity of the coal industry.

After examining the possibilities of low temperature carbonisation, Mr. Tizard expressed his strong opinion that this, as a national enterprise, was dead. Hydrogenation of coal had produced enthusiastic letters in *The Times* from scientific sources, but the crucial point at issue was, not whether coal could be converted into oil by hydrogenation, but whether it would be economic to do so. A comparison and analysis of the relevant figures led him to the conclusion that it was just barely possible to make oil by hydrogenation, but that it was very unlikely to be an economic undertaking. Any lower estimate he would regard with the greatest scepticism, and though by this process we could not only potentially but actually produce petrol at a price which experience had shown to be by no means prohibitive to the road-transport industry—a pretty big conclusion—there was no possibility, so far as he could see, of producing it in open competition with natural oil. In his opinion we were not likely to make oil from coal at a lower price on a thermal basis than we could make electricity from coal, and so long as supplies of oil existed, so long oil must win. You could only get over that by such an import tax as would be practically prohibitive of the import of oil, and that on economic grounds would be a mistake of the first order.

British Association—Chemistry Section

Proceedings of Centenary Meeting

THE Organising Committee of the Chemistry Section at this year's British Association Centenary Meeting has made arrangements for the publication of a volume containing the whole of the proceedings of the Section in full, entitled *Chemistry at the Centenary Meeting of the British Association for the Advancement of Science*. This volume will include Sir Harold Hartley's Presidential Address on "Michael Faraday and the Theory of Electrolytic Conduction"; the discussion on the influence of the medium on the properties of electrolytes; the discussion on chemistry of the vitamins and related substances; the symposium on the British Fuel Problem; the discussion on the structure of simple molecules; and an account of the exhibits.

The volume will constitute the only complete record of the discussions on these subjects in which rapid advances are being made at the present time. It should be ready by the end of October, and copies may be supplied on publication at a cost of 5s. each, post free, on early application to the Local Secretary, Mr. J. Davidson Pratt, c/o W. Heffer and Sons, Ltd., 104, Hills Road, Cambridge. Applications should be accompanied by the necessary remittance.

New President of American Chemical Society

DR. L. V. REDMAN, the new president of the American Chemical Society, has been vice-president and director of research to the Bakelite Corporation since 1922. From 1910 to 1914 he was industrial fellow and assistant professor at Kansas, subsequently becoming president to the Redmanol Chemical Products Co. He is very widely known in American chemical circles, being a recognised authority on phenol condensation products. He has also taken an active part in the work of the American Chemical Society and the Chemists Club, was chairman of the New York Section of the Society of Chemical Industry in 1926, and has visited England on more than one occasion. His genial personality, and his excellent gift of language in dealing with technical subjects, will go far to make him widely popular in assuming the leadership of the A.C.S.

Rock Wool

Canadian Resources for Insulating Material

As a result of experimental work conducted by M. F. Goudge, mineral technologist to the Division of Mineral Resources, Ottawa (Canada), it has been found that rocks, or mixtures of rocks, from the Niagara Peninsula have definite possibilities as raw material for the manufacture of rock wool, one of the most effective insulating materials on the market.

This rock wool is a furnace product made from self-fluxing siliceous and argillaceous dolomite, in which the basic and acidic constituents are present in such proportions that their fluxing action is nearly balanced. It has been demonstrated on a laboratory scale that, if the natural rock or mixture of rocks has a chemical composition within the limits shown, and in addition if the acidic and basic constituents in the furnace charge be present in such proportion that the ratio of weighted acids to weighted bases be above 0·80, the material will yield rock wool fibres. In the process of manufacture the rock, with coke as fuel, is charged to a small cupola furnace where it is melted to a very fluid condition. The operating temperature is reported to range from 2,800° to 3,300° F. The molten rock, coming in a small stream from the furnace, is atomized by a blast of steam under a pressure of 80 to 100 pounds. Each small globule of molten rock, as it is hurtled through the air, trails behind it a very thin, pliable, glassy fibre. These fibres constitute the rock wool of commerce.

In appearance rock wool resembles sheep's wool, but, unlike the latter, it cannot be woven. Rock wool is sometimes sold in bulk, but more often is processed and sold in granulated form, in blankets, or treated with a binder and sold in the form of blocks and sheets under the name of "rock cork." Besides its use as an insulating material for a range up to 1,000° F (for which purpose it is rated as one of the most effectual materials available in commercial quantity), rock wool finds application as the main ingredient in acoustic tile, and as a corrosion resistant packing for acid carboys.

Methane as a Metallurgical Reducing Reagent

OBVIOUS economic advantages in the use of methane as reducer in metallurgical operations are apparent from simple considerations of the stoichiometric relations of the reduction reactions in relation to the cost of methane according to a paper read by C. G. Maier (Bureau of Mines) on the occasion of a recent meeting of the American Chemical Society at Buffalo. Less obvious advantages depend on the lower temperatures utilisable with methane as compared to solid carbon as reductant. It may be generally assumed that elementary carbon reacts with solid oxides through the producer gas reaction ($C + CO_2 = 2CO$), and many experimenters have shown this latter to be slow below 1,000° C. Methane reductions become thermodynamically possible and appreciable at temperatures not coal and oil might find a way into the markets of the world greatly above 800° C. Experiments are still in progress at smelting works, from which further developments can be expected.

British Association Visit Fulham Laboratories

Gas Industry's Debt to Research

On Saturday, September 26, some 200 members of the British Association visited the central laboratories of the Gas Light and Coke Co. at the Fulham Gasworks, and were entertained to luncheon afterwards in the Horseferry Hall at the company's main offices at Westminster. The guests (who included a very large number of eminent chemists) were met at the works by Sir David Milne-Watson (the Governor of the Company). They had the opportunity of inspecting some of the plant in the main part of the works, but the chief interest centred upon the laboratories, at which fundamental research into problems connected with the manufacture and purification of gas is carried out. The laboratories were arranged on this occasion to illustrate the main lines along which chemists are working there and at the fifteen other laboratories maintained by the company, and there were also exhibits showing new types of gas appliances developed at the Research Laboratories at Watson House. Among the officers of the company who accompanied the visitors on their tour and were present at the luncheon, were Mr. T. Hardie (chief engineer), Mr. H. Hollings (chief chemist), Mr. Stephen Lacey (mains engineer) and Mr. R. W. Foot.

At the luncheon the toast of the "Gas Light and Coke Co.," with which was coupled the name of Sir David Milne-Watson, was proposed by Sir J. A. Ewing, and was supported by Sir Richard Threlfall, and Sir Harold Hartley, all of whom voiced the thanks of the guests to the company and to Sir David for their hospitality.

Sir J. Alfred Ewing described the visit to Fulham as an intellectual and "illuminating" treat, and said it was a revelation to him to see what was being done in connection with the manufacture of gas. The guests constituted a mixture in very unequal proportions, of chemists and engineers, the chemists being, very properly, in the enormous majority; but in the works of the company there was a very happy combination of engineering and chemistry, achieving wonderful results. Recently he had had to deal with a comparison between two somewhat rival sources of power—the steam engine and the internal combustion motor, and he had had to point out that, notwithstanding all the triumphs of the internal combustion motor, the steam engine was neither dying nor dead and was still doing an enormous part of the work of the world. Very much the same remark might be made of gas in relation to electricity. He could recall that in the earliest days of applied electricity, about 1880, the chairmen at the meetings of the various gas companies made reassuring remarks to the effect that the shareholders had nothing to fear from the competition of electric light. Nevertheless, the value of gas shares had gone down and down; but the people who were wise and prescient invested in gas shares then, just as they should invest in British securities now. In those early days, one very eminent inventor of a fundamental piece of electrical apparatus put his last shirt on gas shares (laughter)—and made a very considerable fortune by so doing.

The development of scientific laboratory work at Fulham was wonderful; it was delightful and refreshing to see such scientific investigation going on in the interests of a particular industry.

Sir Richard Threlfall (who officially opened the Fulham laboratories in 1928) referred to the excellent work done in the laboratories and to the clearness of the information given by the staff. Simple language such as they had used constituted one of the highest tests of a perfect knowledge of the subject.

Sir Harold Hartley said that although the company was nearly 120 years old, it was full of life, was not living on its past, and, as the visitors had seen at the laboratories, it was anticipating the future. That state of affairs, in so old an institution, required a little explanation. The foremost reason was Sir David himself (applause), who, by his courageous leadership and single-minded devotion to the interests of the company, had made it what it was. Another reason was that Sir David had a weakness for chemists. He had a wonderful team who worked together with enthusiasm, determined that the company should be not only the largest in the world, but also the best of its kind. Chemists sometimes forgot how much they owed to gas, and how impotent they would be without it. He did not believe that even Sir Richard Threlfall—whose *Laboratory Arts* was the book in our generation which came nearest to Faraday's *Chemical Manipulation*—could make a good T-piece by means of glass and electricity (laughter).

Sir David Milne-Watson, responding, assured the guests that, though there had been many interesting gatherings in the Horseferry Hall, he very much doubted whether any had been of such interest as this particular one. After some historical references to the Gas Light and Coke Co.—in which he reminded the guests that gas was made commercially for the first time in the world on the site of the company's present offices, and from that site gas was first supplied to the public, that gas was first installed in Pall Mall 119 years ago, and that the present-day gas lighting there and in Whitehall was not bettered anywhere in the world—Sir David commented on the company's appreciation of the value of scientific research as the only means of effecting real advancement.

Modern Crushing and Grinding Machiney

William Johnson and Sons (Leeds), Ltd., whose works are at Armley, Leeds, have been in existence since 1860, having specialised in various types of plant used by chemical manufacturers. Originally known for their brickmaking machinery they introduced the briquetting of chemical substances in addition to coal or ores, or combined with a proportion of fuel, and this system has been of great service in developing certain chemical processes. Over 40 years ago they manufactured crushing and grinding machinery which was then of the most up-to-date design, such as ring-roll mills, Chilean mills, disintegrators, pulverisers, etc., and later they introduced into this country the ball-tube mill system of fine grinding for both wet and dry materials. These machines are now used for the reduction of cellulose acetate, fluorspar, red oxide, barytes, etc. One instance is the reduction of chrome ore to the fineness of 98 per cent., passing through a screen having 40,000 holes per square inch. The time saved in subsequent treatment by acids quickly repays the user the cost of installing the plant.

They have further introduced machinery applicable to the ball-tube mill which enables this machine to be used with materials having an amorphous structure, where the ball-tube mill alone may be unsuitable. The same progress is now taking place in other trades, and where fine grading of materials is essential, the slow speed ball-tube mill method is found to give the most economical results. They have put upon the market the wind-swept ball mill for pulverised fuel firing purposes for either furnaces or boilers, which is able to handle coal containing up to 18 per cent. moisture and reduce it to the required fineness without the use of any pre-dryer. Mills of this type are manufactured for outputs of 200 lb. per hour up to 15 tons per hour. This type of mill is equally applicable to the reduction of other materials to the finest of powders, and will produce a product equal to a grade of 98 per cent. passing 325 mesh.

In addition to fine grinding mills, William Johnson and Sons specialises in crushers, elevators, conveyors, screens, calciners, dryers, washers and mixers of many types, automatic feeders and measurers, etc. They also lay themselves out to manufacture machines or plant to clients' own designs, or design and manufacture machines or plant to suit users' requirements.

A Reputable Make of Acid-Resisting Bricks

The Cattybrook Brick Co., Ltd., of Bristol, has been in existence for about 65 years, and has one of the highest reputations as manufacturers of facing and engineering bricks. Their acid-resisting vitrified bricks have been used extensively for the erection of acid tanks and other purposes in chemical works, where they are required to stand up to the most exacting conditions. Unlike many bricks used for these purposes, the Cattybrook product is not only hard but extremely tough. The head office of the company is at 9–11, St. Stephen's Street, Bristol, and their works are at Almondsbury, Glos. (G.W.R. sidings), and Mangotsfield, Glos. (L.M. & S. sidings). They will be pleased to forward samples and quotations to chemical manufacturers who are contemplating the reconstruction of any portion of their works or the erection of new buildings.

Limestone and Lime in Industry

By M. F. Goudge

The following extracts are taken from a report on limestone recently issued by the Department of Mines, Canada. This report reviews the many uses for lime and limestone in great detail, and includes a considerable amount of data concerning specification requirements.

DESPITE the fact that limestone is such an important raw material, it has received but little detailed study in comparison with other materials entering various processes, and detailed specifications for limestones are rare. Exact specifications are difficult to prepare because, although pure limestones are desirable for chemical purposes, it is often possible to use a cheaper and less pure material provided that impurities especially deleterious to the process are not present in too great amount.

Requirements of Metallurgical Industries

The metallurgical industries consume enormous quantities of limestone. For the production of one long ton of pig iron more than 1,100 lb. of limestone is required, and a further 250 lb. of limestone is used in converting the pig iron to steel. Dolomite either raw or calcined is used for patching and lining the floors of basic open-hearth furnaces; for this purpose an average of 100 lb. of dolomite per ton of steel is required. In Canadian blast furnace practice only high-calcium limestones are used for flux. None of the limestones in present use have a content of more than 4 per cent. magnesium carbonate, although amounts up to 15 per cent. are not considered troublesome. A non-crumbly stone between 1½ and 4 ins. in size is desired. One of the main functions of limestone being to flux off the silica in the ore, a limestone low in silica is preferred, but a silica content up to 10 per cent. is not prohibitive if the stone is available at a sufficiently low price. It is simply a question of balancing the increased operating expense of slagging the additional silica, against the lower price of the low-grade limestone. The alumina content of a blast furnace flux should be below 2 per cent. Sulphur and phosphorus are very objectionable impurities; and the content of neither should exceed 0·1 per cent. The basic open-hearth process requires a high-calcium limestone for flux. The limestone must be purer than that for blast furnace use. Silica should not exceed 5 per cent., alumina 1½ per cent., magnesium carbonate 10 per cent. Sulphur and phosphorus must be low. The usual size for open-hearth flux is between 4 and 8 ins. Crushed high-calcium lime is used by some mills to the extent of 100 lb per ton of steel to thicken the slag towards the end of the open-hearth process. The lime for this purpose must be pure, and especially low in phosphorus.

High-calcium lime is used as a lubricant and acid neutraliser in the process of steel-wire drawing. For this use it must be absolutely free from grit. In coke by-product plants a pure high-calcium lime is used in the preparation of ammonia and of ammonium sulphate. In the metallurgy of copper, nickel, lead, zinc, gold, silver and other metals, both lime and limestone are used—limestone as a flux in smelting, lime as a reagent in flotation plants and cyanide mills. Quantities of lime up to 20 lb. per ton of ore are used in the selective flotation of copper, lead, molybdenite, and graphite from mixed sulphide ores. The function of the lime is to prevent sulphides of iron and zinc from floating. In the cyanide process of extracting gold and silver from their ores, from 3 to 5 lb. of lime per ton of ore is added for the twofold purpose of maintaining a protective alkalinity in the solution, thus preventing excessive consumption of the expensive cyanide, and of aiding in the settling of the slimes. The lime for these uses must be made from a high-calcium limestone; for use in cyanide mills it must be absolutely free from bits of charcoal and coke.

Pulp and Paper Manufacture

The pulp and paper industry is a large user of lime and limestone. In the making of a ton of sulphite pulp 375 lb. of limestone is consumed if the acid-tower system is employed and 200 lb. of lime is required if the milk-of-lime system is used. A further 130 lb. of lime is needed in bleaching each ton of sulphite pulp. The sulphate pulp process requires 500 lb. of lime per ton of pulp produced. For the making of a ton of bleached soda pulp about 600 lb. of lime is needed. In the two latter processes it is possible to recover most of the lime for further use. Rag paper requires from 120 to 250 lb. of lime per ton of rags, depending on the kind of rag used. In the manufacture of sulphate and soda pulp, lime performs the same function in each case—that of causticising the cooking liquor. The lime should be made from a pure high-calcium limestone, but in practice some limes having a total of 7 per cent. of silica, iron oxides, and alumina are used. Magnesia is the most troublesome impurity, as it is very slow in settling, and a lime with less than 2 per cent. magnesia is desired. A fast settling, lightly burned lime is preferred. Bleaching solution for wood pulp is prepared from liquid chlorine and milk of lime. Hydrated lime is generally used, as it is necessary that the temperature of the solution be kept low. The lime should be made from a very pure high-calcium limestone and preferably should be slow in settling.

The calcium carbide industry within recent years has attained a prominent place among chemical industries: calcium carbide, aside from its value as a source of acetylene, is the base for the manufacture of many valuable chemicals and solvents. It is made by melting limestone and coke in the electric furnace. Practically two tons of limestone is used in the making of one ton of carbide. Present practice is to calcine the limestone before charging it to the electric furnace. For this use an extremely pure limestone is required. The phosphorus content must be below 0·01 per cent. and magnesia should be less than 2 per cent. in the stone. Likewise the silica content should be under 3 per cent.

Sugar Refining

The sugar refining industry is a large user of limestone and lime. Approximately 700 lb. of limestone is needed for the refining of one ton of beet sugar by the carbonation process. A particularly pure limestone having less than 1 per cent. silica and less than 1 per cent. magnesia is required. Lime in much smaller quantities is used in the defecation process for refining cane sugar. A similarly pure limestone is necessary to make lime for this purpose. In the manufacture of soda ash by the ammonia-soda process, about 1¼ tons of limestone is used per ton of soda ash produced. The limestone, in pieces 1 to 6 ins. in size, is burned in a mixed-feed kiln with coke as fuel. The CO_2 gas is recovered and used in the process. The lime is used in the recovery of ammonia. A high-calcium limestone is required. Chemical purity, though not essential, is desirable.

Glass Manufacture

The glass industry requires limestone for most of its products. Limestone may form as much as 30 per cent. of the total materials in some grades of bottle and window glass. Canadian tanneries utilise between 3,500 and 4,000 tons of lime per year in the removing of hair from hides. Lime for this purpose should be low in content of iron oxides and magnesia. It should be free from grit and preferably be slow in settling. Bleaching powder is simply hydrated lime saturated with chlorine gas. The lime must be white and high-calcium in composition. The magnesia content must be less than 1½ per cent.; it is one of the most objectionable impurities, for it forms magnesium chloride which absorbs water from the air, giving a sticky powder. The iron oxide content must be low because iron decomposes and discolours and bleaches. It has been found that some limes are much better suited to the manufacture of bleaching powder than others, even though the chemical composition may be almost identical.

The Portland cement industry is also a limestone industry. A finished Portland cement should analyse 60 to 65 per cent. CaO, 20 to 25 per cent. SiO_2, 5 to 12 per cent. combined Al_2O_3 and Fe_2O_3, and less than 4 per cent. MgO. Magnesia is the important factor in connection with a limestone for Portland cement manufacture. The amount of magnesia in the cement must not exceed 4 per cent. This restriction usually makes it impossible to use any limestone having a content of more than 8 per cent. magnesium carbonate. A limestone as low as possible in magnesia is preferred.

Non-Metallic Mineral Fillers

Within recent years a large and growing demand has arisen for non-metallic mineral fillers. Of these, whiting and whiting substitute are the most widely used. Whiting is prepared from imported chalk; whiting substitute is prepared by the fine grinding of a suitable limestone. These materials are of importance in the manufacture of numerous products. For instance, putty is simply 85 per cent. of whiting and 15 per cent. linseed oil. Whiting may form 15 per cent. of linoleum. In cold-water paints or kalsomines it functions as a pigment of high opacity and usually forms 80 per cent. of such paints. Whiting is more generally used in the compounding of rubber than is any other material except sulphur. Some cigarette papers contain as much as 30 per cent. whiting or precipitated chalk: its use accelerates the burning of the paper by reason of the fact that the heat of the burning cigarette drives off the CO_2 gas from the whiting, this opens the pores of the paper and promotes combustion. Whiting is also used in polishes, fireworks, inks, dyes, ceramic glazes, in the manufacture of certain electrical appliances, and for many other purposes. In practically all of these uses the substitute may replace the true whiting to a varied extent.

Precipitated chalk finds use as a filler and is used in tooth pastes, polishes, and other materials. It may be prepared by saturating milk-of-lime with CO_2 gas. A pure high-calcium lime is required for this purpose. Pulverised limestone is extensively used in rock-dusting coal mines, and as an asphalt filler. The first mentioned use requires a non-siliceous limestone, preferably one which will yield a light-coloured dust. The British specifications require that 100 per cent. shall pass through a 20-mesh screen and 50 per cent. through a 200-mesh screen. The chief requirement for an asphalt filler is that it be ground sufficiently fine so that from 65 to 85 per cent. will pass a 200-mesh screen and all pass a 30-mesh screen. The uses of limestone and lime in the agricultural industry have been mentioned. Pulverised limestone, applied directly to the soil, functions in correcting soil acidity and also in lightening heavy clay soils by increasing their porosity. It also serves as a plant food. It is used as an active filler in some varieties of chemical fertilisers to counteract the acidity of some of the chemicals. High-calcium lime also forms the base in the compounding of fungicides and insecticides such as Bordeaux mixture, lime-sulphur and calcium arsenate.

Other Industrial Uses

Caustic soda in Canada is mostly produced by electrolytic methods, but in pulp mills and in some other industries solutions of caustic soda are made by causticising a solution of soda ash with quicklime. In water softening and purification, both for domestic and industrial use, high-calcium lime fulfils an important function. Lime enters into nearly every common process of water treatment. It is very efficient in rendering water bacterially safe. In the textile industry, lime is used in the bleaching and dyeing of certain fabrics. A pure high-calcium lime practically free from iron is necessary. The hardwood distillation industry uses lime chiefly in the production of calcium acetate. Calcium oxide is the only active constituent of the lime in this process, therefore a high-calcium lime is used. About 800 lb. of lime is required to produce 1 ton of calcium acetate. The sand-lime brick industry is based upon the use of lime as a binder for silica sand. The usual proportion is 10 lb. of quicklime to 100 lb. of sand. The lime after complete hydration is mixed with the sand and the mixture is pressed into bricks. The bricks are then hardened by a high-pressure steam process. The United States Bureau of Standards specification for quicklime for this purpose stipulates that the lime shall contain at least 85 per cent. calcium oxide and not more than 5 per cent. magnesia.

Ethyl Abietate

A REPRESENTATION has been made to the Board of Trade under Section 10 (5) of the Finance Act, 1926, regarding exemption of ethyl abietate from duty imposed by Section 1 of the Safeguarding of Industries Act, 1921. Any communication should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, S.W.1, within one month from September 30.

Chemical Trade in British India

Large Decrease in Imports

IN the course of a survey of the import trade of India during the first three months of the fiscal year, April 1 to June 30, 1931, H.M. Senior Trade Commissioner in India (*Board of Trade Journal*, September 10), states that during the three months under review the value of imports decreased, as compared with the corresponding period of 1930, by Rs. 14 crores, or 28 per cent., and amounted to Rs. 36 crores, and the total exports, including re-exports, fell by Rs. 27 crores, or 40 per cent., to Rs. 40 crores.

The total trade in chemicals was only slightly reduced from Rs. 72¾ lakhs to Rs. 69¼ lakhs. Details of the countries of origin are not yet available, but the principal items included under this heading are as follows:—

	1931 Rs. (lakhs)	1930
Acids	2	3
Bleaching powder	2¼	1½
Carbide of calcium	2	2½
Disinfectants	3	3¼
Potassium chlorate	1	2
Soda bicarbonate	2	2
Caustic soda	8	6
Sodium carbonate	20	19¾
Sodium cyanide	1¼	1
Sodium silicate	½	1
Sulphur (brimstone)	4	5

Decreasing Imports of Dyestuff Materials

The total imports (of alizarine), which had decreased from 2,073,100 lbs. (Rs. 10¾ lakhs) in 1929 to 1,112,886 lbs. (Rs. 5½ lakhs) in 1931, declined still further during the period under review to 566,054 lbs. (Rs. 2¾ lakhs). The United Kingdom's share fell from 160,832 lbs. (Rs. ¾ lakh) to 62,282 lbs. (Rs. ½ lakh). The remainder of the imports came from Germany, whose share was reduced from 844,086 lbs. (Rs. 4 lakhs) to 503,772 lbs. (Rs. 2¼ lakhs).

For aniline, a fall from 4,503,685 lbs. (Rs. 60½ lakhs) to 2,744,358 lbs. (Rs. 51½ lakhs) is recorded. The United Kingdom supplied 197,792 lbs. (Rs. 2¾ lakhs), as compared with 287,601 lbs. (Rs. 3½ lakhs) in the previous year. Imports from Germany were reduced from 3,173,418 lbs. (Rs. 41½ lakhs) to 1,866,800 lbs. (Rs. 37¼ lakhs), and those from the United States from 561,625 lbs. (Rs. 5¾ lakhs) to 306,002 lbs. (Rs. 3½ lakhs). Smaller imports were received from Italy amounting to 197,631 lbs. (Rs. 2¼ lakhs), Switzerland 118,521 lbs. at Rs. 4¼ lakhs, Belgium 9,248 lbs. (Rs. ¼ lakhs), and the Netherlands 5,310 lbs. (Rs. 7,000). Shipments from France at 34,263 lbs. were slightly higher than during the previous year, but the value at Rs. 60,000 was slightly less.

In paints and colours reduction, from Rs. 31 lakhs in 1929 to Rs. 24¼ lakhs in 1930, continued in 1931, when the total was Rs. 17 lakhs. The British share fell from Rs. 16¼ tt Rs. 10¼ lakhs. Imports from Germany remained constano at Rs. 2¼ lakhs, while those from the United States fell by Rs. 1½ lakhs to Rs. ¾ lakh. There was a slight rise in imports from Japan which amounted to Rs. ¾ lakh.

Commercial Visitors to the Colonies

THE attention of British firms who may be making arrangements for their representatives to visit Empire markets is directed to the facilities and assistance which the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, is in a position to render. This Department will furnish such representatives with letters of introduction to H.M. Trade Commissioners in the Dominions and Colonies. These officers are always pleased to welcome visitors from the United Kingdom, and, through their organisation, are well placed to render considerable assistance to representatives of British firms. Should information as to general conditions in the markets in question be required prior to the departure of the representative, the Department is prepared to render any assistance possible either by letter or by personal interview. Information which can be afforded includes lists of importers, information as to the market for particular commodities, particulars of tariffs, names of likely agents, import statistics, and general hints to commercial visitors.

Indian Chemical Notes

(From Our Indian Correspondent.)

The "Chir" Tar

The Forest Research Institute, Dehra Dun, has been making experiments in "Chir" tar, chir being a kind of tree. When first manufactured, this tar was proved to be unsuitable for road painting owing to its very low viscosity and density. But after further experiments, it has now been stated that this tar can be improved by proper treatment and can be turned into a really useful product suitable as a road surfacing material. This result was obtained by driving off the lighter fractions from the crude "chir" tar so as to leave the pitch. This pitch was softened by the addition of some of the lighter oils and was then vulcanised. Samples of this tar of improved quality are being tested on certain roads to find out if it is as effective as imported tar.

The Malt Industry

Another question which came before the Council was the application by the Madras Government for a grant for the investigation of chemistry of malting cholam. Cholam is the poor man's crop in Madras and if its use can be extended in the form of malt, it would be the small agriculturalist who would be the gainer. Malted products were not consumed in the Madras Presidency alone, but all over India, which imported annually something like Rs. 30 lakhs' worth of malted stuffs. If, therefore, the investigation was fruitful in result, it would assist the establishment of a new Indian industry. The Imperial Council decided to initiate the industry by research and as a start, grants were sanctioned for a well-equipped laboratory and three chemists.

Bengal Bell-Metal Industry

The Engineering Section of the Bengal Industrial Research Laboratory under the Industries Department has been able to lower the cost of bell metal by inventing a new and cheaper method of preparing bell metal. The ingredients of the alloy in common use are approximately 77 per cent. of copper and 23 per cent. of tin. The same effect has now been reached without any difference in the quality of the metal by replacing the expensive tin with a certain proportion of zinc and by using a trace of aluminium when melting the alloy in the crucible. The cost of the constituent metal is cheaper by 35 per cent. Also the fluidity of the alloy at normal moulding temperature is so greatly improved that the homogeneous condition of the resulting casting gives better consistent results than are obtained in ordinary practice.

Manufacturing Caustic Soda

The prospects of manufacturing caustic soda in the State of Hyderabad were examined recently by an expert, who has reported that it is quite possible to manufacture it by the electrolytic process, as cheap electric power would become available in course of time within the State from the Nizamsagar project. The present requirements of the Hyderabad State are only one ton of caustic soda per day, which is likely to increase to two tons in the near future. The difficulty, however, will be in regard to the disposal of the by-products. In regard to chlorine there will be some difficulty at first, but there is increasing demand for this article both in the form of liquid chlorine and of hypo-chlorites for water purification, bleaching purposes, etc. The only raw material required is common salt, which can be obtained from British India at a price not exceeding Rs. 70 per ton exclusive of tax, and the cost of the plant would not exceed Rs.3 lakhs.

Manufacture of Soap

The by-product hydrogen in the process will have to be used in the preparation of hardened oils, and in this connection the possibilities of using hydrogenated oils for the preparation of soap in the State were also examined. At present soap is generally manufactured in the State by the semi-boiled process from a mixture of cocoanut and groundnut oils. But if, by means of hydrogenation, fats resembling tallow and capable of being substituted for it in cold process soap manufacturers can be prepared and used, the industry might benefit considerably. It is stated that in place of coconut oil, mowrah oil and ground nut oil can be used with less cost while the quality of the product would be considerably improved. It has therefore been recommended by the expert that the encouragement of the boiling process in soap manufacture and the introduction of the hydrogenation process are necessary, in order to encourage the use of greater quantities of indigenous oils by the soap making industry of Hyderabad. It will not also be difficult to find markets for the surplus products of an oil hydrogenation factory.

Indian Stores Department

Various protests have been raised against the reported proposal to abolish the Indian Stores Department. The Punjab Chamber of Commerce have represented to the Government of India that thereby the Government's policy of encouraging Indian industries would be checked, and the Indian Chamber of Bombay, in a representation to the Retrenchment Committee, even advocate the strengthening of the Department and handing over to it the functions now performed by the separate independent agencies of the Army and the Railway Stores. They further desire that it should not be optional to the provinces to adopt the Stores Rules of the Government of India. It is also complained that the policy accepted some time ago—that all purchases for Government requirements should be made in India by tenders called for in rupees for delivery in India—has not yet been given effect to completely.

Substitute for Ghee

The Industries Department of the Government of Madras have carried out recently some very valuable experiments for refining groundnut oil, gingelly oil, cocoanut oil and vegetable oil, with a view to popularising the manufacture of these oils on economic lines. One of the chief aims of promoting these experiments is to provide the public with cheap and wholesome oil for consumption. One other important experiment in progress is the manufacture of a substitute for ghee. The product which has been evolved as a result of these experiments is said to be quite palatable and wholesome.

Salt Protection Results

A conference of Indian salt manufacturers was recently held in Bombay at which the results of the protection which the Indian salt industry now enjoys were discussed. It was agreed that the good results have begun to be visible and that during the current year their production would come up to 88 per cent. of the total requirements of Bengal. In their opinion, if protection was extended by rigidly keeping out foreign salt then within two or three years India could be made self-sufficient in her salt requirements. Only 12 per cent. had now to be made good from foreign sources. It was complained that foreign dealers were still maintaining the lowest rates and dumping their salt at practically the cost of the sea-freight.

Transparent Wrapping Papers

Increasing Markets Anticipated

The varied uses and growing potentialities of transparent wrapping paper, as evidenced by the development of cellulose sheeting of this type, are attracting greater attention on the part of the European paper industry, which is now developing a number of paper impregnating processes with the object of maximum transparency.

Impregnation, as a paper converting process, has developed very rapidly in Europe during recent years, although it has by no means attained the importance and proportion that it has in the United States. The more common processes, such as waxing, oiling, and asphalting, have been known for years, but the use of such papers, compared to the American consumption, is quite in its infancy in Europe. On the other hand, certain processes have been developed here notably in the manufacture of transparent papers, and are more extensively used than in the United States. European trade leaders state that advantages of transparency in wrapping materials have always been obvious, but because of the investment necessary in its manufacture, and possible patent infringement litigation, there have been comparatively few competitive developments, except in cheaper imitations. Some of these are gelatin and others impregnating processes. Impregnating is the least expensive, requiring comparatively simple equipment. The solutions used seem to have a varnish base, although the actual composition is the secret of the manufacturer, and analysis is difficult. There has also been a gradual improvement in the quality of these types of paper, most of which are produced from a tissue paper base, but the perfection of transparent cellulose sheeting has not yet been reached. The vogue for transparent wrappings has also been taken up by vegetable parchment manufacturers. So-called silver parchments have appeared on the market in Germany.

Safety at Dry Cleaning Works*

By D. Crockatt

THE chief danger in the dry cleaning trade is concerned with the use of spirit for dry cleaning, and arises either from its inflammability or its toxic qualities. The risk of partial asphyxiation in cleaning out vessels is very definite. Most cleaners have underground storage systems for their cleaning spirit, and often there is an arrangement of large settling tanks to free the liquor from the coarser forms of impurities. These impurities settle to a sludge on the bottom of the underground tanks and from time to time it is necessary to dig out the sludge. As these tanks are set in the ground and have to be puddled in with clay the use of two man-holes is not, of course, possible. At our own works the first time a new settling system was cleaned out we used the manhole in the top of the tank, but even though artificial ventilation was used, more and more fumes were given off during the digging out of the dirty sludge at the base of the tank, and we were so impressed with the dangers of gassing that the next time the settling system was cleaned out we decided to remove not merely the manhole lid, but the whole top of the tank, breaking the main joint in order to expose the whole diameter of the tank to the air. All such storage tanks should be made with removable tops or very large lids, so that there is no need to depend on the usual manhole.

Dangers in Drying Tumblers

Of late years there has been an increasing use of drying tumblers for dyeing goods after dry cleaning. These bring certain new dangers into the works. The vapour of the petroleum spirit used may form an explosive mixture, especially in presence of heat in the tumbler. This is not the biggest risk in the use of these tumblers, as when the machine is running there is such a huge turnover of air that it is difficult to imagine that enough spirit vapour could be present to form an explosive mixture. If the machine is loaded with wet clothes and allowed to stand even for a few minutes, there is a very much greater danger of an explosive mixture being formed, and therefore machines should not be left loaded during meal hours. There is one risk which is even greater. Such machines collect fluff and lint in great quantities around the fan work, the ducts and in the base of the machine. However careful sorters may be in searching pockets, it is impossible to remove all matches as they lodge in the lining of coats and waistcoats. At every cleaning of the drying tumbler, match heads may be found amongst the deposit of lint. This leads to a great danger of fire, and frequent cleaning of the machine is essential. We attach such importance to it that we do not allow a machine to be put into commission again by the workmen without thorough inspection by the general works foreman.

Increasing Use of Non-Inflammable Solvents

In former years all dry cleaners used very light volatile spirits such as petrols and benzines. Latterly there has been an increasing use of the much heavier white spirit, which, with a flash point very much higher, greatly minimises the danger from fumes and of fire and explosion. Non-inflammable spirits, such as chlorinated hydrocarbons like carbon tetrachloride and trichlorethylene, are now being used more particularly on the Continent and in America. The use of these spirits is still in the experimental stage in this country and their value is doubtful. Their cost is high, and in place of a fire risk the user subjects himself to a very great new risk by reason of the toxic qualities of the spirit. The middle course, which would appear to be the best policy for the dry cleaner, is to use white spirit, which greatly reduces the risk of fire and involves very little danger of asphyxiation.

Beet Sugar Season Opens

THE Bardney factory of the Lincolnshire Beet Sugar Co. is opening again this week, receiving the first consignments of beet from farmers. The total acreage under cultivation in Lincolnshire is this year about 45,000, compared with over 60,000 acres last year before the new subsidy restrictions came into operation.

* Extract of paper presented to the recent "Safety First" Conference at Leeds. The author is associated with John Crockatt, Ltd., dyers and dry cleaners, Leeds.

Chemical Matters in Parliament

Coal Refining (Lehmann Process)

IN the House of Commons, on Thursday, September 24, Mr. T. Smith asked the Secretary for Mines whether the inquiry into the Lehmann process of coal refining has been completed; and, if so, whether he can make a statement with regard to the conclusions arrived at.

The Secretary for Mines (Mr. Foot): A demonstration of the Lehmann process was recently arranged in Germany, at which an officer of the Fuel Research Division of the Department of Scientific and Industrial Research was present. Certain tests on German coals were carried out, and a report on the tests has been prepared. Some additional information is being obtained from Germany and until this is received it is not considered desirable to make any statement as to the conclusions contained in the report.

Mr. Smith: Can the hon. member say that when the results have been arrived at they will be made public?

Mr. Foot: I cannot say whether they will be made public. If the results are satisfactory, we shall be glad to make them public.

Research on Paperboard Containers

DR. EDWARD R. WEIDLEIN, Director of the Mellon Institute of Industrial Research, Pittsburgh, announces that an industrial fellowship for research on moisture-proofing and grease-proofing paperboards used in cartons and boxes has been established in that institution by the Robert Gair Co., of New York. Recent progress in package merchandising has indicated a growing need for paperboard containers with improved moisture-proofing and grease-proofing qualities, and it is the hope of the Robert Gair Co., the donor of the Fellowship, and of the Mellon Institute that technically valuable advances will result from the studies begun on September 1.

Dr. Marion D. Coulter has been appointed a Fellow of the Institute to conduct these scientific investigations. He is a specialist in organic chemistry and during the period 1925-1930 held a Mellon Institute fellowship for the study of certain problems in cellulose technology. According to Dr. Weidlein, Dr. Coulter's new research on perfecting moisture-proof and grease-proof paperboards for packages will be of interest to many industries. If successful, the investigational developments are expected to make possible important economies and improved efficiency in distribution, as well as to act as a further stimulus to the growth of package merchandising.

British Industries Fair, 1932

IN a letter which is being sent to its members this week the Association of British Chemical Manufacturers states that the departure from the gold standard is expected to increase foreign sales considerably and to attract more foreign buyers. Firms wishing to increase their space in the British Industries Fair should forward their applications immediately. The British Optical Instrument Manufacturers' Association is among other organisations of manufacturers to take similar action. It is stated at the Department of Overseas Trade that five-sixths of the space in the Olympia section of the Fair is already let and in view of the action of the various manufacturers' organisations it is not expected that it will be long before the announcement is made that the Fair is full. In the Birmingham section at Castle Bromwich over 80 per cent. of the space is already booked.

A New Form of Soft Iron

HIGHLY purified iron, possessing many of the qualities of copper, has been prepared in Germany by a new process described recently by Dr. Ing. L. Schlecht. Carbon monoxide of a high degree of purity is passed over hot iron previously purified by ordinary methods, forming liquid, iron carbonyl. On heating this liquid, carbon and oxygen are driven off, leaving iron in an exceedingly finely powdered form with hardly a trace of impurities. The individual spherical particles are 20-millionths of an inch in diameter. When this powder is heated still further to a temperature of 1200° C. it changes into solid iron that resembles copper in its softness, resistance to corrosion and other properties. The process is declared to be applicable on a large scale. German patents on the process are held by I. G. Farbenindustrie.

From Week to Week

DR. E. F. ARMSTRONG, F.R.S., is removing his offices from Bush House, Aldwych, W.C.2, to 48, Broadway, Westminster, S.W.1, as from October 1. His new telephone number will be Victoria 7532.

THE GERMAN STEEL TRUST tinplate works at Wissen recently announced that 1,100 men are to be dismissed. Ninety per cent. of the production of these works is sold abroad on a sterling basis.

A FIERCE FIRE BROKE OUT on Thursday, September 24, at the Victory Shellac Works, at Hackney Wick, London. In less than an hour the centre portion of the factory was destroyed. Only two men were in the portion involved, and they escaped unhurt.

THE BARROW STEEL CO. announce that operations will be resumed early next week at their works which have been idle for some months. Two furnaces will be put in operation on smelting iron and the following week the steel department, which has also been idle for some time, will be restarted.

THE BIRTLEY IRON CO., near Newcastle, have received an order for a large dry coal cleaning plant for Russia. The plant, which will be installed in the Donetz Basin, will be the first of its kind to be erected in Russia under the Five Year Plan. The Birtley Co. hope that similar orders will be received from the same source as developments in Russia proceed.

THE NORTHERN ALUMINIUM CO., who have just completed the erection of a large factory at Banbury to employ several hundred people, announced last week that they would not open until the New Year. During the current week, however, it was announced that, as business shows distinct signs of an improvement, the directors have decided to commence work as soon as possible.

AN INTERNATIONAL PETROLEUM CONFERENCE opened on Monday, September 28, at the Ministry of Commerce in Paris. Its object was the co-ordination of work already achieved with a view to the standardisation of methods of analysis of liquid fuel. Among the countries represented were Great Britain, Germany, United States, Italy, Greece, Holland, Portugal, Roumania, Switzerland, Czechoslovakia, and Jugoslavia. Dr. A. E. Dunstan (president of the Institute of Petroleum Technologists) represented Great Britain.

IN CONTINUANCE OF THEIR POLICY of arranging periodical public lectures on fuel problems by well-known authorities, the Governors of the Sir John Cass Technical Institute have now announced a lecture on "High Temperature Carbonisation: a Survey of Development," the lecturer being Dr. E. W. Smith and the chairman, Sir David Milne-Watson. There can be no doubt but that lectures of this nature fill a very useful purpose. The time of the lecture, 8.15 p.m., on Monday, October 12, has been fixed to enable those engaged during the day to be present.

A SYMPOSIUM ON STREAM POLLUTION and the treatment of industrial waste is to be the principal feature of the winter meeting of the American Institute of Chemical Engineers, to be held in Atlantic City, N.J., December 9–11. Although important contributions on this subject have been presented at previous meetings of the institute, this is the first time that a major programme has been developed around this theme. It is expected that this session will reveal the latest American practice, and will, therefore, offer an interesting corollary to the papers read in England in December, 1930, at the conference on the Utilisation of Trade Wastes, held by the Institution of Chemical Engineers.

AN OFFICIAL PRELIMINARY REPORT for 1930 indicates a gain of 4 million in the capital invested in Canadian chemical industries. The figures for 1930 were $169,982,605, as compared with $165,886,912 in 1929. There was also a gain in the number of plants, the total for 1930 being 590, as against 557 in 1929. While the gross sales value of production during 1930 ($122,266,852) was 16 million less than the total for 1929, the records show that the ratio of the cost of raw materials and the payment in salaries and wages to the total value reported for the year's output amounted to only 57·4 per cent., as against 56·3 per cent. in 1929, and 57·6 per cent. in 1928. For 1927 the ratio was 59·6 per cent., and in 1926 it stood at 59·4 per cent.

RECENT WILLS INCLUDE: Mr. John Hampton, of Wolverhampton, director of A. Bellamy and Co., Ltd., manufacturing chemists, £4,950 (net personalty £4,529).

MAY AND BAKER, LTD., of Battersea, London, S.W.11, have announced a further advance in the price of bismuth salts, amounting to 3d. per lb. on carbonate and corresponding differences on other salts.

ROTHERHAM'S new College of Technology was opened on Tuesday, September 29, by Lord Aberconway. The total cost of the structure is estimated at £84,000, towards which £9,000 has been given as a grant by the Miners' Welfare Committee.

SIR J. ALFRED EWING, of Cambridge, has been elected President of the British Association for 1932. Sir Alfred, who retired from the principalship of Edinburgh University in 1929, was president of the Engineering Section at this year's meeting of the British Association.

THE ANNUAL DINNER AND DANCE of the Institute of Fuel will be held at the Connaught Rooms, Great Queen Street, London, W.C.2, on Wednesday, October 21, when the President, Sir Hugo Hirst, Bart., will preside. A large number of distinguished guests will be present, and the toast of "The Fuel Industries" will be proposed by the Rt. Hon. Sir Robert Horne.

MR. W. F. DARKE has found it necessary to relinquish the office of Honorary Secretary to the Chemical Engineering Group. He will be succeeded by Mr. Donald McDonald, who has been a member of the Group since its formation. Mr. McDonald is a graduate of London University, and since 1910 has been associated with the well-known firm of Johnson, Matthey and Co., Ltd.

THE BOARD OF DALMELLINGTON IRON CO., LTD., have issued a circular to shareholders stating that after protracted negotiations a provisional agreement had been entered into by the directors of William Baird and Co., Ltd., and of their subsidiary company, the Sanquhar and Kirkconnel Collieries, with a view to the amalgamation of certain colliery interests belonging to the three companies. This amalgamation provides for the formation of a new company, to be called Bairds and Dalmellington, Ltd., which will have a capital of £1,750,000.

THIS MONTH MARKS THE 50TH ANNIVERSARY of the incorporation of the Solvay Process Co., and the establishment of an alkali industry in the United States. The original plant at Syracuse, N.Y., was erected for the production of 30 tons of soda ash per day. Rowland Hazard was the founder and the first president of the Solvay Process Co. Associated with him was W. B. Cogswell. It was he who first conceived the idea of negotiating with Ernest Solvay of Belgium for the establishment of an American plant and in 1880 having secured Hazard's financial backing, Cogswell journeyed abroad and closed the deal. The Solvay Process Co. ultimately became one of the important units in the group comprising the Allied Chemical and Dye Corporation, and in 1927 the Solvay Sales Corporation was formed to control the sale of Solvay products.

IN CONNECTION WITH RECURRENT REPORTS that the Chilean Government might dissolve Cosach (Compania Salitrera Chilena), leading members of the Government and Opposition have informed Press correspondents in Santiago de Chile that this is most unlikely, and that probably nothing more will be done than to effect some minor changes to satisfy the loudest political critics. The Chilean Chamber last month passed a resolution calling for the revision of the Cosach Law legalising the formation of this £75,000,000 combine, and a special committee is now investigating the question. Meanwhile, the promise of one of the candidates at the Presidential election, Señor Alessandri, to dissolve Cosach should he be elected is meeting with ridicule, while the rival candidate, Señor Montero, refuses even to discuss the issue as being outside the political domain.

Obituary

MR. THOMAS MEDLAND STOCKER, J.P., of Trelawney, St. Austell, managing director of English China Clays, Ltd., on board the Cunard liner *Aquitania*, bound for New York, September 24, aged 56.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

349,958. Hydrocarbons. Endothermic Gas Reactions. Imperial Chemical Industries, Ltd., Millbank, London. T. S. Wheeler and W. B. Fletcher, Winnington Hall, Northwich, Cheshire. Application date, January 27, 1930.

Endothermic gas reactions at temperatures above 1,000° C. and at high space velocities, *e.g.*, the pyrolysis of hydrocarbons to obtain benzene, etc., as described in Specification

FIG. 3.

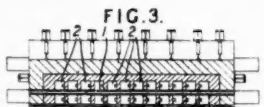
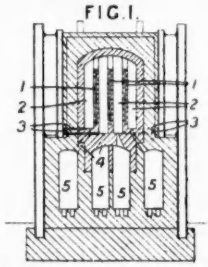


FIG. 1.



349,958

No. 342,319 (see The Chemical Age, Vol. XXIV, p. 422), are effected in reaction chambers 1, which are long, deep, and very narrow, *e.g.*, 1–2 inches wide and several feet long and deep, and constructed of or lined with refractory material such as sillimanite. The reaction chambers 1 are arranged in a combustion chamber 2 having transverse walls 6 dividing it into a number of flues. Gas for combustion is admitted through ports 3 and air for combustion through ports 4, after preheating in the generators 5. The apparatus is also suitable for the production of hydrocyanic acid from ammonia and hydrocarbons as described in Specification No. 335,947. (See The Chemical Age, Vol. XXIII, p. 532.)

350,010. Ethers. H. D. Elkington, London. From Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, 30, Carel van Bylandtlaan, The Hague. Application date, March 5, 1930. Addition to Specification No. 332,756 (see The Chemical Age, Vol. XXIII, p. 292).

Diluents for lacquers and varnishes, and solvents for oils and fats, are obtained by treating aliphatic alcohols having at least 2 carbon atoms in the molecule under pressure at a temperature of 200°–300° C. in the presence of ferrous chloride, copper sulphate, stannous chloride, manganese chloride, aluminium chloride, chrome or potash alum, or chromium sulphate. Dibutyl ether and di-isopropyl ether are described.

350,030. Dyes. R. S. Barnes, R. F. Thomson, J. Thomas, and Scottish Dyes, Ltd., Earl's Road, Grangemouth. Application date, March 1, 1930.

Dibenzanthrone or its halogenated derivatives is treated with a strong oxidising agent, such as potassium dichromate, in the presence of aqueous nitric acid. Examples are given of the treatment of dibenzanthrone and pentachlor-dibenzanthrone. The products dye grey, and blue to black shades.

350,080. Wetting Agents. H. T. Bohme Akt.-Ges., 29, Moritzstrasse Chemnitz, Saxony, Germany. International Convention date, April 27, 1929.

Wetting agents are obtained by treating sulphonated alcohols containing at least 6 carbon atoms, *e.g.*, lauryl alcohol, and stearin alcohol, with heterocyclic nitrogenous bases, or aliphatic or mixed aliphatic-aromatic bases such as methylamine, ethylamine, or methylaniline. Some examples are given.

350,161. Vulcanisation Accelerators. Imperial Chemical Industries, Ltd., Millbank, London; H. M. Bunbury, W. J. S. Naunton, and W. A. Sexton, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, April 29, 1930.

Vulcanisation accelerators are obtained by treating 1-chloro-2 : 4-dinitro-naphthalene with a mercapto-arylene-thiazole in the presence of alkali, the products being 2 : 4-dinitro-1-naphthyl-arylene-thiazolyl-sulphides.

350,379. Wetting Agents. G. B. Ellis, London. From Chemische Fabrik vorm. Sandoz, Basle, Switzerland. Application date, December 6, 1929.

Wetting agents for use in the textile or dyeing industries are obtained by mixing mono-aryl ethers of glycerine or glycol, such as commercial mono-tolyl glycerine or glycol ether, or commercial mono-xylenyl-glycerine ether with aliphatic, aromatic, or hydro-aromatic carboxylic or sulphonic acids or their salts or substitution products. Examples are given.

350,135. Molybdenum Oxide and Ammonium Molybdate. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 14, 1930.

Spent catalysts containing molybdenum compounds mixed with compounds of other metals such as chromium, zinc, or magnesium, are roasted at 400°–600° C. in the presence of nitrogen oxides or air, and then treated with aqueous ammonia to form ammonium molybdate which may be recovered as such or treated with hydrochloric acid to precipitate the oxide. Alternatively, the roasted mass may be treated with a mixture of hydrochloric and nitric acids to dissolve the other constituents, leaving molybdic acid. In another alternative the roasted mass is treated with ammonium sulphide sufficient to precipitate the other metals as sulphides, but insufficient to form ammonium sulpho-molybdate. Molybdenum oxide is then precipitated by adding hydrochloric acid. The sulphides of the other metals may be roasted to oxides. The arrangement of plant is described.

350,167. Phosphatic Fertilisers. A. Buchleitner, 11, E. Thunstrasse, Salzburg, Austria. International Convention date, April 30, 1929.

An iron bath containing phosphorus is alternately enriched with phosphates by adding phosphorites in the presence of a reducing agent, and then deprived of part of its phosphorus by oxidation, the phosphorus pentoxide being combined with lime to form calcium phosphate.

350,343. Sodium Nitrate and Ammonium Chloride. Chemieverfahren Ges., 15, Wilhelmstrasse, Bochum, Germany. International Convention date, October 3, 1929.

Liquor containing ammonium chloride and ammonium carbonate obtained in this process is treated with gypsum and then with sodium chloride and ammonia, and the resulting sodium sulphate-calcium carbonate mixture is separated and treated with nitric acid to obtain sodium nitrate, which is crystallized. The mother liquor is employed to dissolve fresh sodium sulphate, gypsum is precipitated and carbon dioxide evolved and used again. The mother liquor obtained after separating the sodium sulphate-calcium carbonate mixture is cooled and treated with carbon dioxide to obtain a solution containing ammonium chloride and ammonium carbonate for use in the first step of the process.

350,413. Hydrogen and Carbon. Ruhrchemie Akt.-Ges. Holten, Sterkparde, Germany. International Convention date, December 6, 1928.

Methane is subjected to a single heating to 900°–1200° C. for a few seconds, or to repeated heatings, to obtain a mixture of methane and hydrogen containing up to 60 per cent. of hydrogen for the autogenous treatment of metals. The amount of carbon also obtained is an index of the amount of hydrogen.

350,425 and 350,432. H. T. Böhme Akt.-Ges., 29, Moritzstrasse, Chemnitz, Germany. International Convention date, February 6, and March 6, 1929.

350,425. Emulsifying and fat splitting agents are obtained by treating aralkyl or aryl esters of aliphatic carboxylic acids containing at least 9 carbon atoms, or alkyl, aralykl or aryl esters of cyclic carboxylic acids not containing hydroxy groups, with intensive sulphonating agents such as oleum, sulphur trioxide, brom- or chlor-sulphonic acid or mixtures of anhydrous lower fatty acids or their anhydrides or chlorides with any sulphonating agent. Alternatively, alkyl esters of aliphatic carboxylic acids containing at least 9 carbon atoms are treated with oleum, sulphur trioxide, or brom- or chlor-sulphonic acid, or the carboxylic acids may be treated with an intensive sulphonating agent and a phenol or alcohol added. Examples are given of the sulphonation of ricinoleic-N-butyl ester with oleum, ricinoleic methyl cyclohexanol ester with chlor-sulphonic acid, oleic benzyl ester with oleum, β-naphthoic acid isopropyl ester with chlor-sulphonic acid, ricinoleic acid with oleum and isobutyl alcohol added, and several others. The products are similar to those obtained according to Specification No. 315,832 (See THE CHEMICAL AGE, Vol. XXI, p. 294).

350,432. Sulphonated lauryl or myristyl alcohol are added to liquid and plastic preparations to improve the wetting and dispersing properties.

350,438. LIQUID FUEL. H. Wade, London. From Standard Oil Co., Chicago, U.S.A. Application date, March 5, 1930.

Hydrocarbons obtained by cracking oil in the vapour phase or by destructively distilling coal or peat are mixed with up to 0·05 per cent. of benzyl-amino-phenol or the corresponding methyl, dimethyl, isopropyl or butyl derivative, or with dihydroxy-diphenyl-amine, to prevent the formation of gum.

350,440. LIQUID FUEL. L. Mellersh Jackson, London. From H/H Oil Co., Aktieselkabet, 7, Dyrkob, Copenhagen. Application date, March 7, 1930.

Aromatic hydrocarbons are treated with nitric acid, and then with sulphuric acid under such conditions that no nitro compounds are formed. The product is mixed with aliphatic hydrocarbons and the mixture treated with oxygen or ozone at increased pressure to obtain motor fuel.

350,451. CATALYSTS. A. A. Thornton, London. From Soc. d'Etudes et l'Exploitation des Matières Organiques, 83, Rue Arago, Puteaux, Seine, France. Application date, March 10, 1930.

Catalysts are obtained by treating coiled wires first with chlorine and then with ammonia to obtain a layer of porous metal formed on a non-porous core of the metal.

350,494. PURIFYING HYDROCARBON OILS. S. T. Henderson, Winnington Hall, Northwich, Cheshire, and Imperial Chemical Industries, Millbank, London. Application date, March 12, 1930.

Hydrocarbon oils are treated in the liquid phase with nascent hydrogen and then with sulphuric acid or bauxite to remove unsaturated hydrocarbons. In an example, crude petroleum oil or distillate, or coal tar distillate, *e.g.*, motor benzole is refluxed with sulphuric acid and zinc dust or scrap-iron, or with caustic soda and zinc. The oil is separated, treated with concentrated sulphuric acid, and then distilled.

350,573-4. PURIFYING SULPHUR. S. I. Levy, Conaways, Ewell, Surrey. Application date, March 15, 1930.

350,573. Sulphur from mineral deposits is melted and treated with reagents in powder or in concentrated solution which will form compounds insoluble in the sulphur with impurities such as arsenic, antimony and chlorine. The reagents include metallic oxides, hydroxides, carbonates, and sulphides of alkali and alkaline earth metal, and different reagents may be used in succession. Sulphur is removed by settling and filtered. Thio-arsenate which is formed from the arsenic impurity is removed and treated with carbon dioxide or acids to deposit yellow arsenic sulphide. The insoluble residue may be used as a fungicide or an agricultural dressing.

350,574. Sulphur is freed from volatile impurities such as arsenic, antimony and selenium, by treatment in the vapour or liquid state with an excess of chlorine or sulphur chloride in order to form chlorides with the impurities. The chlorides may be removed by distillation or by scrubbing with air at a pressure of 25–50 mms. of mercury. The liquid sulphur may be scrubbed by treating in a finely-divided condition in a tower in counter-current to the air, and the gases with volatile chlorides of the impurities may be scrubbed with water or with aqueous alkaline solutions to obtain the oxides or oxychlorides. If arsenic is present in large amount, the sulphur may first be treated in liquid form with an excess of sulphur chloride and most of the arsenic distilled off. Selenium is removed by agitating the molten sulphur with sulphur chloride and distilling under reduced pressure. Traces of sulphur chloride are finally removed by scrubbing the molten sulphur with steam and distilling.

350,625. SULPHUR AND ARSENIC SULPHIDES. L. Mellersh Jackson, London. From Patentaktiebolaget Grondal Ramen, 3, Norrmal Samstorg, Stockholm. Application date, March 31, 1930.

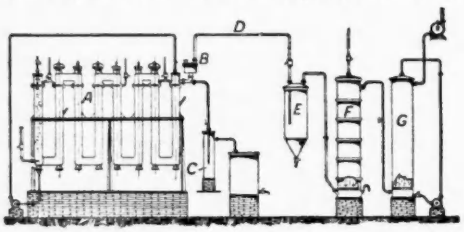
Pyritic ores are smelted in a blast furnace with fluxes and a solid reducing means to obtain a pyritic or partly pyritic smelting in the lower part of the furnace, and a substantial consumption of the reducing agent in the higher part of the furnace by sulphur dioxide, arsenious oxide and oxygen. Sulphur and arsenic are condensed outside the furnace, the arsenic being in combination with the sulphur.

350,642. DISPERSIONS OF ARYLAMIDES OF SALICYLIC ACID. Imperial Chemical Industries, Ltd., Millbank, London, A. J. Hailwood, and A. Stewart, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, April 9, 1930.

Arylamides of salicylic acids are ground or milled in water in the presence of soaps or sulphonated organic compounds such as sulphonated naphthalene formaldehyde condensation products and sulphite cellulose pitch. The products are employed for proofing textiles against mildew, etc.

350,395. CHLORINATED HYDROCARBONS. A.C.N.A. Aziende Chimiche Nazionali Associate, 51, Via Torino, Milan, Italy. International Convention date, July 3, 1929.

A gaseous mixture containing unsaturated hydrocarbons, *e.g.*, a mixture of hydrogen, nitrogen, carbon, monoxide, ethylene, acetylene and benzene vapour, is treated with



350,395

chlorine in U-shaped pipes A filled with iron turnings and containing a liquid such as carbon, tetrachloride, tetrachlorethane or pentachlorethane. The chlorine acts only on the last three constituents of the gas, giving dichlorethane, tetrachlorethane and chlorbenzene. The system may be watercooled, and the chlorinated liquid passes to a liquid-sealed vessel C. Gases pass through pipe D to a separator E where any chlorine derivatives are condensed, and then to a scrubber F fed with water and finally to a column G fed with milk of lime or dilute caustic soda.

350,457. DYES. S. Percival, London. From A.C.N.A. Aziende Chimiche Nazionali Associate, 51, Via Torino, Milan, Italy. Application date, December 10, 1929.

Dibenzanthrone or isodibenzanthrone suspended or dissolved in an inert anhydrous organic medium such as nitrobenzene, xylol or naphtha and in the presence of aluminium chloride, is treated with another chloride which chlorinates by transformation into a lower chloride, *e.g.*, phosphorus pentachloride. The products are dyestuffs giving red-blue shades.

350,490. SYNTHETIC RUBBER. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, February 12, 1929.

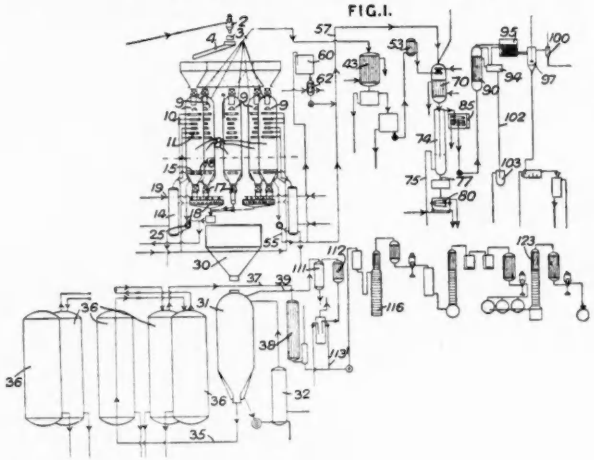
Mixtures containing 2 : 3-dimethyl-butadiene and butadiene or isoprene are polymerised, mixed with finely divided soot and employed for making vehicle tyres. An example is given.

350,491. LIGNIN AND METHYL ALCOHOL. A. Zennström, 61, Rue Boursault, Paris. International Convention date, May 13, 1929.

Wood shavings, rich in resin, are treated in boilers 8 with steam and sodium carbonate or caustic soda lye of 10° Bé.

The spent material is discharged at 17 and washed in a screw conveyor 18 to recover resin soap lye, and then discharged through a hopper 30 to a cellulose boiler 31. The liquor passes through the boiler and a preheater 32 to diffusers 36, and methyl alcohol is obtained in the apparatus 38 and 111 . . . 123. Gas from the boiler passes to a separator 111 and cooler 112 from which liquor passes to the spirit line at 113[1]. Resin

FIG.I.



350,491

lye from the boilers 8 is treated with hot acid and turpentine vapours in vessel 70 and the condensate is collected at 74. Aqueous liquor is separated and the resin solution passes to a heater 85. Lignin from vessel 74 is washed and dried, and carbonised with strong mineral acids. The product is treated with hot sodium hydrate and then with hot acids, washed, dried at 80°–110° C., heated to 1,000°–1,100°C. in a reducing atmosphere, yielding a colloidal active carbon. The hot resin solution passes through a tubular still 90, and the resin passes to a boiler 94 and collector 103. Turpentine vapours are condensed in a cooler 95.

Specifications Accepted with Date of Application

356,716. Metalliferous dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. June 8, 1929.

356,724. Hydrocyanic acid, Production of. Ges. für Kohlentechnik. June 7, 1929. Addition to 356,190.

356,728. Halogen-anthraquinones, Production of. R. J. Loveluck, R. F. Thomson, J. Thomas, and Imperial Chemical Industries, Ltd. June 6, 1930.

356,738. Derivatives of polyhydric alcohol-polybasic acid condensation products. Imperial Chemical Industries, Ltd., and W. Baird. May 6, 1930.

356,739. Ammonium sulphate, Production of. H. Koppers Akt.-Ges. May 21, 1929.

356,741. Concentration of solutions of lower aliphatic acids. British Celanese, Ltd., H. F. Oxley, and L. Fallows. May 30, 1930.

356,742. Resin acid derivatives, Production of. Chemische Fabriken Dr. K. Albert Ges. August 19, 1929.

356,757. Sulphate of ammonia. H. J. Hodsman and A. Taylor. May 30, 1930.

356,767. Hypochlorite compositions for bleaching, sterilising, and deodorising. L. T. Howells and Electric Smelting and Aluminium Co. June 4, 1930.

356,787. Concentrated aliphatic acids, Production of. H. Dreyfus. May 13, 1930.

356,805. Leuco sulphuric acid esters or ester salts of the ureas of leuco-β-aminoanthraquinone and nuclear substitution products thereof, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) June 12, 1930.

356,821. Soda and potassium hydroxide, Production of. Chemieverfahren Ges. July 13, 1929.

356,923. Improving the age-resisting properties of rubber and rubber-like substances, Process for. Imperial Chemical Industries, Ltd., A. J. Hailwood, and F. J. Siddle. August 27, 1930.

356,931. Optically active phenylpropanol methylamines, Manufacture of. I.G. Farbenindustrie Akt.-Ges. August 31, 1929. Addition to 21821/30.

356,933. Rubber, Manufacture of. Goodyear Tire and Rubber Co. October 5, 1929.

356,966. Vulcanisation of rubber and rubber-like substances. Hungarian Rubber Goods Factory, Ltd., P. Klein, and S. Gotleb. October 13, 1930.

357,026. Phosphoric anhydride and phosphoric acid, Preparation of. Metallges. Akt.-Ges. January 6, 1930.

357,032. Crucibles for electrolysis of fused electrolytes. H. Baron. (*Siemens and Halske Akt.-Ges.*) December 23, 1930.

357,041. Concentrated phosphoric acid, Production of. Kunsdunger Patent-verwertungs Akt.-Ges. January 29, 1930.

357,060. Dyestuffs, Manufacture of. Durand and Huguenin Akt.-Ges. February 15, 1930. Addition to 316,315.

357,061. Bismuth compounds of benzenearsinic acid-stibinic acids, Manufacture of. I.G. Farbenindustrie Akt.-Ges. February 15, 1930.

357,065. Sulphur dyes, especially sulphur blacks. E. I. du Pont de Nemours and Co. February 25, 1930.

357,077. Hydroxy-methyl-benzimidazole-arsonic acids. I.G. Farbenindustrie Akt.-Ges. April 29, 1930.

Applications for Patents

[*In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.*]

Aische, M. I. Preparation of iron blue pigments. 26,735. Sept. 25. (Bakelite Corporation). Mouldable compositions. 26,392. Sept. 21.

Baker Perkins, Ltd. Manufacture of soap. 26,642. September 24.

Bannister, A. R., and Chubb, G. C. P. Emulsifying-apparatus. 26,571. September 23.

Bleachers' Association, Ltd., Farrington, F., Parker, C. S., and Wall, C. L. Dyeing with azoic colours. 26,737. September 25.

—— Dyeing with azo dyes, etc. 26,738. September 25.

—— Dyeing regenerated cellulose. 26,739. September 25.

Böhme Akt.-Ges., H. T. Soap preparations. 26,825. September 25. (Germany, October 6, 1930.)

British Celanese, Ltd. Production of organic compounds. 26,344. September 21. (United States, September 20, 1930.)

——, Groombridge, W. H., and Oxley, H. F. Performing chemical reactions. 26,630, 26,631. September 24.

Carpmael, A. (*I.G. Farbenindustrie Akt-Ges.*). Manufacture of carbazole derivatives. 26,368. September 21.

Chigison, S. C. Manufacture of acid-proof cementing-compositions. 26,692. September 24.

Coles, S. O. Cowper-. Production of rustless iron or steel. 26,606 September 24.

—— Electrodeposition of iron. 26,726. September 25.

Consortium für Elektrochemische Industrie Ges. Manufacture of acetaldehyde, acetone, and acetic acid. 26,576. September 23. (Germany, September 27, 1930.)

Cox, K., and Refiners, Ltd. Purification of benzol, etc. 26,753. September 25.

Dreyfus, H. Manufacture of aliphatic compounds. 26,632. September 24.

—— Manufacture of products having basis of cellulose derivatives. 26,874. September 26.

—— Solutions, compositions, etc., having basis of cellulose derivatives. 26,875. September 26.

Durand und Huguenin Akt.-Ges. Dyeing wool. 26,472. September 22. (Germany, September 22, 1930.)

Eclipse Textile Devices, Inc. Dyeing-apparatus. 26,353. September 21. (United States, October 1, 1930.)

Johnson, J. Y. (*I.G. Farbenindustrie Akt.-Ges.*). Manufacture of magnetic material. 26,556. September 23.

I.G. Farbenindustrie Akt.-Ges. Manufacture of photographic sensitisers, etc. 26,361. September 21. (Germany, September 20, 1930.)

—— Antihalation layers for photographic plates, etc. 26,575. September 23. (Germany, October 31, 1930.)

Imperial Chemical Industries, Ltd., and Mendoza, M. Disazo dyestuffs. 26,314. September 21.

—— Cleansing and softening agent. 26,315. September 21.

—— Manufacture of wetting, etc., agents. 26,414. September 22.

—— Apparatus for cleaning or degreasing materials. 26,677, 26,678 September 24.

Kali-Forschungs-Anstalt Ges. and Kaselitz, O. Production of ammonium phosphate, etc. 26,786. September 25.

Lensvelt, M. W. Process for extraction of hydrocarbons from coal, etc. 26,352. September 21. (South Africa, Sept. 27, 1930.)

Metallges. Akt.-Ges. Production of alkali sulphates and sulphur. 26,595. September 23. (Germany, January 27.)

—— Recovering sulphur from sulphur dioxide. 26,890. September 26. (Germany, March 23.)

Schering-Kahlbaum Akt.-Ges. Manufacture of alkyl derivatives of the cresol ethers. 26,812. September 25. (Germany, September 30, 1930.)

—— Manufacture of di-iodo chelidamic acid. 26,813. September 25. (Germany, October 7, 1930.)

Soc. of Chemical Industry in Basle. Manufacture of diacylated diamines. 26,668. September 24. (Switzerland, September 27, 1930.)

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, October 1, 1931.

THE disorganisation in the markets caused by the departure of this country from the gold standard has been intensified during the past week. Prices of practically every imported chemical product are nominal and stocks in a number of cases are scarce.

General Chemicals

ACETONE.—Considerable business has been placed, with the price nominal at £60 per ton.

ACID, ACETIC.—Price is unchanged, with a substantial business passing.

ACID, CITRIC.—Is quoted at about 11½d. to 1s. per lb., with conditions firm.

ACID, FORMIC.—Firmer and in good request.

ACID, OXALIC.—Offers have been withdrawn and the market is purely nominal.

ACID, TARTARIC.—Higher at 10¾d. to 11d. per lb. less 5 per cent., with conditions extremely firm.

ALUMINA SULPHATE.—The market is purely nominal.

CREAM OF TARTAR.—Higher prices are being quoted at about 85s., with a substantial demand.

FORMALDEHYDE.—In active request, with the market firm at £27 to £28 per ton.

LEAD ACETATE.—The market is nominal.

LITHOPONE.—Firm at about £22 per ton.

POTASSIUM BICHROMATE.—The market continues firm at about 4¼d. per lb.

POTASSIUM PERMANGANATE.—Continues firm at 5½d. to 6d. per lb.

SODIUM BICHROMATE.—In good demand, with price so far unchanged but tending towards higher levels.

TARTAR EMETIC.—Higher at about 11½d. per lb.

Coal Tar Products

OWING to the continued unsettled financial conditions, prices of coal tar products are irregular. For general market purposes, prices are unchanged from last week.

MOTOR BENZOL.—Quoted at about 1s. 4½d. to 1s. 5½d. per gallon, f.o.r.

SOLVENT NAPHTHA.—Quoted at about 1s. 1½d. to 1s. 2d. per gallon, f.o.r.

HEAVY NAPHTHA.—Quoted at about 11d. to 1s. 0½d. per gallon, f.o.r.

CREOSOTE OIL.—Quoted at about 3d. to 3½d. per gallon, f.o.r. in the North, and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Quoted at about 1s. 6d. per gallon, f.o.r., for the 98/100% quality, and at about 1s. 4d. per gallon for the dark quality 95/97%.

NAPHTHALENES.—Quoted at about £2 5s. to £2 10s. per ton for the firelighter quality, at about £2 15s. to £3 per ton for the 74/76 quality, and at about £4 per ton for the 76/78 quality.

PITCH.—Owing to the depreciation in sterling, the export price has been advanced to 55s. to 57s. 6d. per ton, f.o.b. East Coast port.

THE following additional market report has also been received :—

The chemical market is one of the first to be affected by the Exchange position, and while as far as our own manufacture is concerned there is not very much alteration in price to record, there is a definite feeling that present prices are sufficiently low to make purchases an attractive proposition.

Phenol.—Is quiet and prices are unchanged.

Aspirin and Salicylates.—Have been in good inquiry and previous prices are still ruling.

Methyl Salicylate.—Price is advanced 1½d. per lb., and 1-ton lots are in consequence 1s. 4½d., 1 cwts. 1s. 5d., smaller quantities 1s. 5½d.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—During the past week the market displayed a firmer tendency and the price has advanced to about £5 15s. per ton, f.o.b. U.K. port, in single bags. *Home.*—It is reported that large purchases are still being made for spring delivery at the new price of £6 5s. per ton.

NITRATE OF SODA.—The prices reported in our issue of September for the United Kingdom have been withdrawn, and a new price scale is awaited. Prices in France and Belgium appear to be higher than those in operation for sulphate of ammonia.

Latest Oil Prices

LONDON, September 30.—LINSEED OIL was easy. Spot, ex mill, £20 ; October, £15 10s. ; October-December, £15 12s. 6d. ; January-April, £17 ; May-August, £17 15s., naked. RAPE OIL was inactive. Crude, extracted, £30 ; technical refined, £32, naked, ex wharf. COTTON OIL was steady. Egyptian, crude, £23 10s. ; refined common edible, £28 ; deodorised, £30, naked, ex mill. TURPENTINE was dull and 1s. lower. American, spot, 52s. 6d. per cwt.

HULL.—LINSEED OIL, spot and September, closed at £16 ; October-December at £16 7s. 6d. ; January-April at £17 2s. 6d. ; May-August at £17 17s. 6d. per ton, naked. COTTON OIL, Bombay unquoted ; Egyptian, crude, spot, £23 10s. ; edible, refined, spot, £26 10s. ; technical, spot, £26 10s. ; deodorised, £28 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £23, naked. GROUNDNUT OIL, crushed extracted, spot, £28 10s. ; deodorised, £30 10s. SOYA OIL, crushed extracted, spot, £20 10s. ; deodorised, £24. RAPE OIL, crushed extracted, spot, £29 10s. ; refined, £31 10s. per ton. CASTOR OIL, pharmacy, spot, 45s. 6d. ; firsts, 40s. 6d. ; seconds, 38s. 6d. per cwt. COD OIL, 21s. per cwt. TURPENTINE, American, spot, 52s. per cwt.

South Wales By-Products

SOUTH Wales by-product activities continue to be slow and uncertain. The devaluation of the £ is expected to give a big fillip to the export section of the patent fuel trade, but this has not yet materialised. The expectation of better patent fuel business, however, has resulted in more active pitch inquiries, although business is slow maturing, there is no doubt but that pitch is due for a better run than it has experienced for a considerable time. Road tar continues to have a fair call, with quotations ranging from 13s. to 14s. per 40-gallon barrel. Refined tars are quiet, but there is a fair inquiry for both coke-oven and gasworks tar. Naphthas remain quiet, with quotations tending to rise. The patent fuel export has not yet been affected. Patent fuel prices for export are : 19s. to 19s. 9d., ex ship Cardiff ; 19s. to 19s. 6d., ex ship Swansea. Coke prices are : Best foundry, 32s. 6d. to 36s. 6d. ; good foundry, 22s. 6d. to 25s. ; furnace, 16s. to 16s. 6d.

Scottish Coal Tar Products

THE export demand for most products has increased considerably, and prices are, if anything, firmer than they have been for some months. The tarring season is nearing completion, leaving distillers with low stocks, consequently there is no great anxiety to sell pitch for forward shipment. Some of the other products are also becoming quite scarce.

Cresylic Acid.—This remains a dull market, with quotations unchanged. Pale, 99/100%, 1s. 5d. to 1s. 6d. per gallon ; pale 97/99%, 1s. 3d. to 1s. 4d. per gallon ; dark, 97/99%, 1s. 2d. to 1s. 3d. per gallon. High boiling is not plentiful, and value is 2s. 6d. to 3s. per gallon ; all ex makers' works in buyers' packages.

Carbolic Sixties.—More business is offering and value is firm at 1s. 3d. to 1s. 4d. per gallon, according to quality.

Creosote Oil.—While quotations are unaltered at present, supplies are not plentiful. Specification oils, 2½d. to 3d. per gallon ; washed oil, 3¼d. to 3½d. per gallon ; gas works ordinary, 3½d. to 3¾d. per gallon, all f.o.r. works in bulk.

Coal Tar Pitch.—Only small quantities are on offer at about 47s. 6d. per ton, f.o.b. Glasgow. Home price is round 42s. 6d. per ton ex makers' works.

Blast Furnace Pitch.—Stocks are gradually falling, but prices remain at 30s. per ton f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—With prompt supplies very scarce value is firmer at 2⅜d. to 2⅞d. per gallon ex works in buyers' packages.

Blast Furnace Tar is commanding more attention at 2¾d. per gallon f.o.r.

Crude Naphtha.—Production is low, and 4¼d. to 5¼d. per gallon is being obtained.

Water White Products.—The outlet is limited in this area. Motor benzole, 1s. 3¼d. to 1s. 4½d. per gallon ; 90/160 solvent, 1s. 2½d. to 1s. 3½d. per gallon ; and 90/190 heavy solvent, 1s. 0½d. to 1s. 1½d. per gallon, all f.o.r. in bulk.

Advanced Prices for Mercurials

THE following advanced prices for mercurials are announced by May and Baker, Ltd., for quantities under 112 lb. :—

	s.	d.	
Ammoniated lump B.P. (White Precip.)	7	6	per lb.
Ammoniated powder	7	7	,,
Bichloride lump B.P. (Corros. Sub.)	7	6	,,
Bichloride powder B.P. or granular	6	9	,,
Chloride B.P. (Calomel)	8	1	,,
Red oxide cryst B.P. (Red Precip.)	9	5	,,
Red oxide levig. B.P.	8	11	,,
Yellow oxide B.P.	8	8	,,
Persulphate white B.P.C.	7	10	,,
Sulphide black (Hyd. Sulph. cum Sulph. 50 per cent.)	8	3	,,

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, October 1, 1931.

THE present trade position has somewhat dulled the heavy chemical market, but there are definite indications that th lull is purely a temporary one. There is a general tendency to price increases.

Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £45 to £56 per ton; pure, £35 5s. per ton; technical, 80%, £34 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23 per ton; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at 3½d. per lb., ex store.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality, £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station.

ANTIMONY OXIDE.—Spot material obtainable at round about £26 per ton, ex wharf. On offer for shipment from China at about £23 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £23 10s. per ton, ex wharf. Spot material still on offer at £24 per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £9 10s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £38 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £42 to £44 per ton c.i.f. U.K. ports. Brown on offer at about £1 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 2s. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £23 10s. per ton ex store.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £26 15s. per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-ton lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Price not yet fixed.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £8 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Deposition of Metal on Glass

THE United States Bureau of Standards has issued a new Circular (No. 389) dealing with methods for producing mirrors by the chemical deposition of silver on glass. The Brashear, Rochelle salt, and formaldehyde formulas are given, together with a detailed discussion of the precautions which should be taken to avoid danger, and the technique which has been found to yield the most satisfactory results at the Bureau. Methods are also given for the chemical deposition of copper, platinum or lead sulphide, and for the production of reflecting films on glass by cathode sputtering, and by the condensation of vaporised metals. This information will be of great interest to makers of optical instruments, as well as to those engaged in the work of silvering ordinary mirrors. Copies of the circular may be obtained from the Government Printing Office, Washington, D.C., at 5 cents each, postage extra.

A New Institute for the Fermentation Industries

A NEW institute has been established in Brussels, under the title of "Institut National des Industries de Fermentation." The courses in the university section last one year, a large part of the work being performed in the laboratory and in the factory. A series of lectures will be given in this section by specialists in biological chemistry, including Drs. Calmette, Fernbach, Roux, and Schoen (of the Pasteur Institute, of Paris), Bordet (director of the Pasteur Institute, of Brussels), Chapmann (former president of the Institute of Brewing), Effront, Jensen Orla (professor of the École Polytechnique, of Copenhagen), and Sorensen (director of the Carlsberg Laboratories). The institute is under the general direction of Dr. Van Laer, well known for his work in biological chemistry, particularly in the chemistry of brewing. The miniature brewery which has been on view in the Liége Exposition will be installed in the school and will be kept constantly in operation.

Compressed Gas Industry in Canada

FIGURES issued by the Dominion Bureau of Statistics show that production from the compressed gas industry in Canada was valued at $3,557,486 in 1930, as compared with $3,967,416 in 1929. Reports were received from 30 factories in which were employed an average of 472 people, who received $737,240 in salaries and wages during the year. Capital employed amounted to $5,020,875. Acetylene was made in 13 different plants, carbon dioxide in 8, oxygen in 14, hydrogen in 3, solid carbon dioxide in 2, nitrogen in 1, and aqua and anhydrous ammonia in 1 plant. In addition, liquid chlorine was manufactured for sale by Canadian Industries, Ltd., at Sandwich, Ontario, and the hydrogen which formerly was obtained as a by-product of their operations was utilised to produce synthetic ammonia.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, October 1, 1931.

Whether it prove to be permanent or not, there is more activity in the textile industries, especially in the woollen industry of the adjoining county, and dyers and finishers are taking fair quantities of chemicals against contract commitments. With regard to the spot market, chemical traders have found business extremely difficult to negotiate, especially in the market for imported materials, values of which, where they have not actually been withdrawn for the time being so far as spot prices are concerned, have experienced an appreciable upward movement. For the time being, users are not too anxious to pay the extra rates.

Heavy Chemicals

Chlorate of soda is one of the products to move up under the changed financial conditions, and round £29 per ton has been indicated on this market during the past week. There is a fairly steady movement of caustic soda, with contract quotations for the material ranging from £12 15s. to £14 per ton, according to quality. In respect of contract commitments, bichromate of soda prices are maintained on the basis of 3½d. per lb., less 1 to 2½ per cent., according to quantity, but at the moment no definite spot prices are available. Prussiate of soda meets with a moderate demand and prices are nominally unchanged at from 4¾d. to 5¼d. per lb., according to quantity. Bicarbonate of soda is a steady section of the market at round £10 10s. per ton, and a fair amount of interest in this material is being displayed. No important weight of business has been put through in the case of sulphide of sodium, but values are distinctly firm at about £9 10s. per ton for the 60–65 per cent. concentrated solid quality and £8 10s. for the commercial. Phosphate of soda is also on a higher level, and about £11 per ton is being indicated to-day for spot parcels of the dibasic quality. A moderate demand is reported in respect of alkali, which continues firm at round £6 per ton. Hyposulphite of soda is in quiet request, with the photographic grade on offer at up to £15 10s. per ton, and the commercial at £9 10s.

Higher levels compared with last week have to be reported in respect of several of the potash products. About £36 per ton, ex store, has been mentioned in the case of solid caustic potash, although there is no evidence that much business has been done on that basis. Chlorate of potash is likewise dearer on balance at up to £30 per ton. As with the soda product, spot offers of bichromate of potash have been withdrawn for the time being. Permanganate of potash is only in relatively quiet demand, but values are higher at from about 6d. to 6½d. per lb , according to grade. Carbonate of potash is quoted at round £25 10s. per ton, with sales on moderate lines. There is a limited inquiry about for yellow prussiate of potash, with the price range at from 6¾d. to 7¼d. per lb., according to quantity.

There is still a pronounced scarcity of supplies of arsenic of Cornish make, and quotations are firm at about £25 per ton, at the mines, for white powdered. Sulphate of copper is steadier at £18 10s. per ton, f.o.b., but there has been no improvement in the demand for this material. The acetates of lime are in moderate request at £12 to £12 10s. per ton for the grey quality and about £7 10s. for the brown. The lead products are dearer, with nitrate quoted at £29 per ton, and white and brown acetate at £34 and £33 10s.

Acids and Tar Products

The demand for tartaric acid is rather quiet still, but prices have moved up to about 11½d. per lb., with citric acid quoted at 11¾d. Acetic acid is maintained at £35 per ton for the 80 per cent. commercial quality, and about £49 for the technical glacial, moderate sales being put through. With regard to oxalic acid, spot quotations, where these are available at the time of writing, have moved up to as high as 40s. per cwt., ex store.

Pitch continues to be a fairly active section of the by-products market, and prices are firm at up to 52s. 6d. to 55s. per ton, f.o.b. The demand for creosote oil is comparatively small, but at 3½d. to 4¼d. per gallon, naked, at works, values are steady. Solvent naphtha has been in somewhat better call, and for the time being the tendency is strong at up to 1s. 3½d. per gallon, naked. Crude carbolic is unchanged at about 1s. 3d. per gallon, with crystals dearer at 5¾d. to 6d. per lb., f.o.b.

Company News

Southall Brothers and Barclay.—An interim dividend of 5 per cent., tax free, has been declared on the ordinary shares.

Major and Co.—The directors have decided to pass dividend for six months ended September 30 on 6 per cent. and 7½ per cent. cumulative preference shares.

William Blythe and Co.—An interim dividend of 2 per cent. is announced on the ordinary shares. This compares with 3 per cent. paid at this time last year.

British Oxygen Co., Ltd.—In view of the conditions now prevailing, the directors announce that they have decided not to pay an interim dividend on the ordinary shares. Last year the interim payment was 3 per cent.

Sub Nigel, Ltd.—An increase of over 50 per cent. in profits is shown in the accounts for the year to June 30, 1931. At £708,451, the total profit compares with £418,140 a year ago, and with £495,754 in the year to June 30, 1925. The dividend is increased from 40 per cent. to 60 per cent. The sum of £101,241, against £91,655, was expended on equipment, etc., leaving, after providing for taxation, £46,869 to go forward.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

British India.—The Director-General, India Store Department, Belvedere Road, Lambeth, London, S.E.1, invites tenders for 70 tons caustic soda (sample required with tender). Tenders due October 9. Forms of tender obtainable from the above at a fee of 5s.

Egypt.—The Commercial Secretary to the Residency, Egypt, has transmitted to the Department of Overseas Trade copies of the specifications and conditions of tender relative to a contract for the supply and erection at Sollum of a distilling plant, comprising evaporators, pre-heaters, condenser, steam pumping sets, boiler piping, and lifting tackle, required by the Ministry of Public Works. The specifications and conditions of tender can be consulted by interested British firms on application to the Department, 35, Old Queen Street, London, S.W.1. Tenders will be received in Cairo up to November 7.

Weekly Prices of British Chemicals

There are no price changes to report in the markets for general heavy chemicals, rubber chemicals, wood distillation products, perfumery chemicals, essential oils and intermediates. The following changes should be noted :—

	Prices. 22.ix.31	29.ix.31
	Per ton.	Per ton.
	s. d.	s. d.
Tar Products :		
Pitch, medium soft	52 6	55 0
Pharmaceutical and Photographic Chemicals :	Per lb.	Per lb.
Acid, Citric	0 10½	1 0½
Acid, Tartaric	0 10¾	1 0½
Bismuth, carbonate..	6 3	7 3
,, citrate	7 7	8 4
,, nitrate (crystal)	4 8	5 4
,, oxide	9 4	10 4
,, salicylate	6 11	7 7
,, subchloride	9 1	9 11
,, subgallate	7 0	7 6
,, subnitrate	5 6	6 6

Tariff Changes

Zanzibar Protectorate.—The Board of Trade have received copy of a Decree which provides for the continuance in force until June 30, 1932, of the present system of granting a drawback of the clove duty in respect of cloves which have been exported from Zanzibar by the authorised agent of an approved vanillin manufacturer, or of an approved clove oil distiller.

New Chemical Trade Marks

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to October 16, 1931.

AGRAL.

523,109. Class 1. Wetting out and emulsifying agents, being chemical substances for use in the manufacture of sprays for horticultural purposes. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. —May 29, 1931.

GLISSOLENE.

523,613. Class 1. Paints, varnishes, enamels (in the nature of paint), colours, distempers, japans, lacquers, paint and varnish driers, wood preservatives, wood stains, anti-corrosive and anti-fouling compositions, and anti-corrosive oils. Arthur Holden and Sons, Ltd., 218 and 219, Bradford Street, Birmingham; manufacturers.—June 16, 1931.

CARLETTOZE.

524,903. Class 1. Compounds to prevent rust on metals. The firm trading as Carletto Rust Proofing Co., 232, Aston Road, Birmingham; manufacturers.—August 11, 1931.

GELVA.

525,099. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Shawingan, Limited, Marlow House, Lloyds Avenue, London, E.C.3; merchants.—August 19, 1931.

BITUCASK.

525,001. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Wailes Dove Bitumastic, Ltd., Collingwood Buildings, Collingwood Street, Newcastle-on-Tyne; manufacturers.—August 15, 1931.

Opposition to the registration of the following Trade Marks can be lodged up to October 23, 1931.

ARCOGEN.

524,777. Class 1. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. I.G. Farbenindustrie Aktiengesellschaft (a Corporation organised under the laws of Germany), Grüneburgplatz, Frankfurt-on-the-Main, Germany; manufacturers. August 4, 1931.

CARBOFRAX.

523,728. Class 1. Refractory cements. The Carborundum Co., Ltd., Trafford Park Road, Trafford Park, Manchester; manufacturers of abrasive materials. June 19, 1931.

ALFRAX.

523,730. Class 1. Refractory cements. The Carborundum Co., Ltd. June 19, 1931.

Price Arrangements for Iodine and Iodides

CRUDE iodine is now sold by the Chilean suppliers only on the gold dollar basis, and consequently until some other arrangement is adopted, the prices of iodides may be subject to variation from day to day according to the fluctuations in exchange value of the £ sterling compared with the dollar. In consequence, May and Baker, Ltd., of Battersea, S.W.11, announce that deliveries of iodides will be invoiced at the rates current on the day on which orders are received, or on the date of dispatch, whichever may be the lower. Existing contracts will not be affected, and although under present conditions further contracts cannot be entered into, quantities totalling 5 cwt., taken in one or more deliveries over a period of four months, will be subject to rebate of 3d. per lb on potassium iodide and 2d per lb. on sodium iodide, resublimed iodine and iodoform. For 10 cwt. the rebates are 5d. per lb. on potassium iodide and 3d. per lb. on the other three iodides.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

BLYTON, ASTLEY AND CO., LTD., Manchester, manufacturing chemists. (M., 3/10/31.) Registered September 16, £1,000 charge, to A. H. Walsingham, Monton Green, Eccles, architect; charged on 24 and 26, Milton Street, Lower Broughton. *£4,990. September 13, 1930.

BROTEX CELLULOSE FIBRES, LTD., London, W. (M., 3/10/31.) Registered September 22, further charge securing £850 (not ex.), etc. (supplemental to charges dated June 18, 1931, etc.), to Capt. J. A. Holder, Beaulieu, and others; charged on interest in certain secret processes, etc. *Nil. January 13, 1931.

METAFILTERS (1929) LTD., Hounslow. (M., 3/10/31.) Registered September 23, £3,500 debentures part of £25,000; general charge (except Belgrave Mills and 2 and 4, Belgrave Road, Hounslow). *£6,463. December 25, 1930.

Satisfaction

WHELPTON (G.) AND SON, LTD., Hemel Hempstead, manufacturing chemists. (M.S., 3/10/31.) Satisfaction registered September 19, £600, registered November 29, 1912.

London Gazette, &c.

Company Winding Up Voluntarily

B. M. CHEMICAL PRODUCTS CO., LTD. (C.W.U.V., 3/10/31.) By special resolution September 24. Mr. H. C. Walsh, 49, Eastcheap, London, E.C.3, appointed liquidator.

New Companies Registered

AJOTAL, LTD.—Registered September 26. Nominal capital, £3,000 in 2,500 10 per cent. preference shares of £1 and 2,500 ordinary shares of 4s. each. Soap manufacturers, manufacturers and refiners of and dealers in all kinds of oils and oleaginous and saponaceous substances, pharmaceutical, manufacturing and general chemists and druggists, etc. Directors: H. M. Ommanney and D. D. C. Giddins. Solicitors: Sutton, Ommanney and Oliver, 7/8, Great Winchester Street, London, E.C.

BIOZONE PRODUCTS, LTD., 27, Creechurch Lane, London, E.C.3.—Registered September 25. Nominal capital, £1,000 in £1 shares. To adopt an agreement with A. E. Mullis, liquidator of Biozone, Ltd., and to carry on the business of manufacturers of chemical and other products, etc. Directors: E. R. Morris, F. C. Defrates.

BIRD AND STOREY, LTD., 156/157, Aldersgate Street, London, E.C.1.—Registered September 23. Nominal capital, £1,000 in £1 shares. Manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of Paris, gypsum, plasters, disinfectants, fertilisers, salts, acids, etc. Directors: C. C. Pribik, R. H. Klein, N. J. Larkworthy.

BRITISH CARBIDE FACTORIES, LTD., 34, Victoria Street, London, S.W.1.—Registered September 25. Nominal capital, £100 in £1 shares. To carry on the industrial, experimental and commercial exploitation of all or any chemical or electro-chemical processes, and also the manufacture and sale of all products and apparatus relating thereto, particularly the manufacture and sale of carbide of calcium and oxygen and similar products, etc., and to carry on the business of manufacturers of and dealers in Tube Turns electro-chemical products and apparatus, and of electric and mechanically-operated plant, etc. Directors: C. H. Bingham, Jun., and A. P. Baker.